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CLAIMS

[Claim(s)]
[Claim 1]A game system characterized by comprising the following for generating a game image.
A means which is written in a replay data storage means by using virtual camera alteration data as replay data, and is made to memorize when the 2nd object in two or more objects is in a seized condition into a game.
A means to change a virtual camera used for generation of a replay picture based on said virtual camera alteration data contained in memorized replay data.

[Claim 2]A game system characterized by said seized condition being in a lock on state in a shooting game in claim 1.
[Claim 3]A game system characterized by comprising the following for generating a game image.
A means which is written in a replay data storage means by using virtual camera alteration data as replay data, and is made to memorize when action arises between the 1st and 2nd object, or when this action becomes possible.
A means to change a virtual camera used for generation of a replay picture based on said virtual camera alteration data contained in memorized replay data.

[Claim 4]A game system characterized by comprising the following for generating a game image.
A means which is written in a replay data storage means by using virtual camera alteration data as replay data, and is made to memorize when it is judged that given physical relationship is between the 1st and 2nd object based on position data of the 1st and 2nd object.
A means to change a virtual camera used for generation of a replay picture based on said virtual camera alteration data contained in memorized replay data.

[Claim 5]A game system, wherein a virtual camera used for generation of a replay picture is changed into a virtual camera which turns to a direction of the 2nd object from a viewpoint of the 1st object or a player in either of claims 1 thru/or 4 based on said virtual camera alteration data.
[Claim 6]A game system, wherein a virtual camera used for generation of a replay picture is changed into a virtual camera arranged around the 2nd object in either of claims 1 thru/or 5 based on said virtual camera alteration data.
[Claim 7]In either of claims 1 thru/or 6, in a packet used for replay processing, A packet which a packet required for replay processing of the frame concerned was judged, and was judged to be required writes in a replay data storage means as replay data corresponding to the frame concerned, and is memorized, and. A game system, wherein said virtual camera alteration data writes in a replay data storage means as one of said the packets and is memorized.
[Claim 8]A game system on condition that it changed from the last frame in either of claims 1 thru/or 7, wherein virtual camera alteration data is memorized by replay data storage means as replay data.
[Claim 9]A game system, wherein change of a virtual camera becomes disapproval even if change of a virtual camera is directed until a given period passes, after a virtual camera is changed in

either of claims 1 thru/or 8 based on said virtual camera alteration data.
[Claim 10]An information storage medium usable in a computer characterized by comprising the following.
A means which is written in a replay data storage means by using virtual camera alteration data as replay data, and is made to memorize when the 2nd object in two or more objects is in a seized condition into a game.
A means to change a virtual camera used for generation of a replay picture based on said virtual camera alteration data contained in memorized replay data.
Information for realizing.

[Claim 11]An information storage medium characterized by said seized condition being in a lock on state in a shooting game in claim 10.
[Claim 12]An information storage medium usable in a computer characterized by comprising the following.
A means which is written in a replay data storage means by using virtual camera alteration data as replay data, and is made to memorize when action arises between the 1st and 2nd object, or when this action becomes possible.
A means to change a virtual camera used for generation of a replay picture based on said virtual camera alteration data contained in memorized replay data.
Information for realizing.

[Claim 13]An information storage medium usable in a computer characterized by comprising the following.
A means which is written in a replay data storage means by using virtual camera alteration data as replay data, and is made to memorize when it is judged that given physical relationship is between the 1st and 2nd object based on position data of the 1st and 2nd object.
A means to change a virtual camera used for generation of a replay picture based on said virtual camera alteration data contained in memorized replay data.
Information for realizing.

[Claim 14]An information storage medium, wherein a virtual camera used for generation of a replay picture is changed into a virtual camera which turns to a direction of the 2nd object from a viewpoint of the 1st object or a player in either of claims 10 thru/or 13 based on said virtual camera alteration data.
[Claim 15]An information storage medium, wherein a virtual camera used for generation of a replay picture is changed into a virtual camera arranged around the 2nd object in either of claims 10 thru/or 14 based on said virtual camera alteration data.
[Claim 16]In either of claims 10 thru/or 15, in a packet used for replay processing, A packet which a packet required for replay processing of the frame concerned was judged, and was judged to be required writes in a replay data storage means as replay data corresponding to the frame concerned, and is memorized, and. An information storage medium, wherein said virtual camera alteration data writes in a replay data storage means as one of said the packets and is memorized.
[Claim 17]An information storage medium on condition that it changed from the last frame in either of claims 10 thru/or 16, wherein virtual camera alteration data is memorized by replay data storage means as replay data.
[Claim 18]An information storage medium, wherein change of a virtual camera becomes disapproval even if change of a virtual camera is directed until a given period passes, after a virtual camera is changed in either of claims 10 thru/or 17 based on said virtual camera alteration data.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to a game system and an information storage medium.
[0002]
Background Art and Problem(s) to be Solved by the Invention]The game system which can enjoy a shooting game, sports games, a fighting game, etc. is known looking at the game image projected on the screen conventionally. The function called a replay function is usually provided in such a game system.

A player can be seen now from a viewpoint which is different from the inside of a game after a game end in the situation of an own game play by using this replay function.

As conventional technology of the game system which has such a replay function, there are some which are indicated by international publication number WO96/00601, for example.

[0003]However, in the old game system which has a replay function, that the virtual camera which generates a replay picture was beforehand decided to be was always used. For this reason, influence of the game play of the player in the inside of a game, etc. were not able to be reflected in the replay picture. Therefore, the generated replay picture became uniform by monotone more, and was not able to increase the degree of variety of the replay picture.

[0004]The place which it is made in order that this invention may solve the above technical problems, and is made into the purpose loses the monotony of a replay picture, and there is in providing the game system and information storage medium which can increase the degree of variety of a replay picture.

[0005]
[Means for Solving the Problem]In order to solve an aforementioned problem, this invention is characterized by that a game system for generating a game image comprises:

A means which is written in a replay data storage means by using virtual camera alteration data as replay data, and is made to memorize when the 2nd object in two or more objects is in a seized condition into a game.

A means to change a virtual camera used for generation of a replay picture based on said virtual camera alteration data contained in memorized replay data.

An information storage medium concerning this invention includes information (program) for being an usable information storage medium and realizing the above-mentioned means by computer (execution). A program concerning this invention is characterized by being a program for being an usable program and realizing the above-mentioned means by computer (execution).

[0006]According to this invention, if the 2nd object will be in a seized condition, virtual camera alteration data will be memorized as replay data. And based on this virtual camera alteration data, a virtual camera is changed at the time of replay processing (a change, selection). If it does in this way, it comes to be visible to that from which a replay picture generated differed by whether the 2nd object was in a seized condition into a game. as a result, monotony of a replay picture is lost, and the degree of variety of a replay picture can be boiled markedly, and can be raised.

[0007]A game system, an information storage medium, and a program concerning this invention are characterized by said seized condition being in a lock on state in a shooting game. If it does in this way, in a replay picture, it can be known now in which object a player provided an aim in a shooting game, and various replay pictures can be expressed.
[0008]This invention is characterized by that a game system for generating a game image comprises:
A means which is written in a replay data storage means by using virtual camera alteration data as replay data, and is made to memorize when action arises between the 1st and 2nd object, or when this action becomes possible.
A means to change a virtual camera used for generation of a replay picture based on said virtual camera alteration data contained in memorized replay data.
An information storage medium concerning this invention includes information (program) for being an usable information storage medium and realizing the above-mentioned means by computer (execution). A program concerning this invention is characterized by being a program for being an usable program and realizing the above-mentioned means by computer (execution).
[0009]According to this invention, if action becomes possible when actions (prehension, a hit, an attack, defense, a collision, or a hit) arise between the 1st and 2nd object or, virtual camera alteration data will be memorized as replay data. And based on this virtual camera alteration data, a virtual camera is changed at the time of replay processing. If it does in this way, by whether action arose between the 1st and 2nd object in a game, and whether action became possible, it comes to be visible to that from which a replay picture generated differed, and the degree of variety of a replay picture can be raised.
[0010]This invention is characterized by that a game system for generating a game image comprises:
A means which is written in a replay data storage means by using virtual camera alteration data as replay data, and is made to memorize when it is judged that given physical relationship is between the 1st and 2nd object based on position data of the 1st and 2nd object.
A means to change a virtual camera used for generation of a replay picture based on said virtual camera alteration data contained in memorized replay data.
An information storage medium concerning this invention includes information (program) for being an usable information storage medium and realizing the above-mentioned means by computer (execution). A program concerning this invention is characterized by being a program for being an usable program and realizing the above-mentioned means by computer (execution).
[0011]According to this invention, if it is judged based on position data of the 1st and 2nd object that given physical relationship is between the 1st and 2nd object, virtual camera alteration data will be memorized as replay data. And based on this virtual camera alteration data, a virtual camera is changed at the time of replay processing. If it does in this way, by whether given physical relationship arose between the 1st and 2nd object in a game, it comes to be visible to that from which a replay picture generated differed, and the degree of variety of a replay picture can be raised.
[0012]A game system, an information storage medium, and a program concerning this invention, Based on said virtual camera alteration data, a virtual camera used for generation of a replay picture is changed into a virtual camera which turns to a direction of the 2nd object from a viewpoint of the 1st object or a player. If it does in this way, the 2nd object enters in a view and a replay picture which is located near an attention point and is in sight can be generated.
[0013]A game system, an information storage medium, and a program concerning this invention are changed into a virtual camera with which a virtual camera used for generation of a replay picture is arranged around the 2nd object based on said virtual camera alteration data. If it does in this way, a replay picture seen from the 2nd object side can be generated now, and force of a replay picture can be increased.
[0014]A game system, an information storage medium, and a program concerning this invention, In a packet used for replay processing, a packet required for replay processing of the frame concerned is judged, A packet judged to be required writes in a replay data storage means as replay data corresponding to the frame concerned, and is memorized, and said virtual camera

alteration data writes in a replay data storage means as one of said the packets, and is memorized. If it does in this way, in order to sort out a packet required for replay processing of the frame concerned and for a replay data storage means to memorize, a replay data storage means can be used efficiently without futility. When change arises in specification of replay data and new replay data needs to be memorized, this can be coped with easily.

[0015]On condition that a game system, an information storage medium, and a program concerning this invention changed from the last frame, virtual camera alteration data is memorized by replay data storage means as replay data. When doing in this way and virtual camera alteration data does not change over a long time, useless data can prevent the situation memorized by replay data storage means. Thereby, an operating storage capacity of a replay data storage means can be saved.

[0016]In a game system, an information storage medium, and a program concerning this invention, even if change of a virtual camera is directed, change of a virtual camera becomes disapproval until a given period passes, after a virtual camera is changed based on said virtual camera alteration data. Also when doing in this way and changing instruction of a virtual camera occurs frequently, since change of a virtual camera becomes disapproval, the situation where a virtual camera changes frequently and a replay picture becomes unsightly can be effectively prevented between given periods.

[0017]

[Embodiment of the Invention]Hereafter, the suitable embodiment of this invention is described using a drawing. Although this invention is explained below taking the case of the case where it applies to a shooting game, this invention is not limited to this but can be applied to various games.

[0018]1. An example of the block diagram of this embodiment is shown in the lineblock diagram 1. this embodiment just containing the treating part 100 (or -- the treating part 100, the storage parts store 140 or the treating part 100, the storage parts store 140, and the information storage medium 150 are included -- ****ing), and at least, it in the figure, About the other block (for example, the final controlling element 130, the image generation part 160, the indicator 162, the sound generation part 170, the sound output part 172, the communications department 174, the I/F part 176, memory card 180 grade), it can be considered as arbitrary components.

[0019]The treating part 100 performs processing of various kinds, such as control of the whole system, directions of the command to each block in a system, and game computation, here, and the function, It is realizable by hardwares, such as CPU (a CISC type, a RISC type), DSP, or ASIC (gate array etc.), and a given program (game program).

[0020]The final controlling element 130 is for a player to input manipulation data, and the function can realize it by hardwares, such as a lever, a button, a cross key, and a housing.

[0021]The storage parts store 140 serves as work regions, such as the treating part 100, the image generation part 160, the sound generation part 170, the communications department 174, and the I/F part 176, and can realize the function by hardwares, such as RAM.

[0022]The information storage medium (it is an usable storage by a computer) 150, The information on a program, data, etc. is stored and hardwares, such as an optical disc (CD, DVD), a magneto-optical disc (MO), a magnetic disk, a hard disk, magnetic tape, or semiconductor memory (ROM), can realize the function. The treating part 100 performs processing of the versatility of this invention (this embodiment) based on the information stored in this information storage medium 150. That is, various information (a program, data) for realizing the means (block included especially in the treating part 100) of this invention (this embodiment) (execution) is stored in the information storage medium 150.

[0023]A part or all of information that is stored in the information storage medium 150 will be transmitted to the power up to a system, etc. at the storage parts store 140. The information memorized by the information storage medium 150, At least one, such as the program code for processing this invention, picture information, sound information, configuration information of a display thing, table data, list data, player information, information for directing processing of this invention, information for processing according to the directions, is included.

[0024]According to the directions from the treating part 100, etc., the image generation part 160 generates various kinds of pictures, outputs them to the indicator 162, and the function, It is realizable by hardwares, such as ASIC for image generation, CPU, or DSP, and a given program (image generation program) and picture information.

[0025]According to the directions from the treating part 100, etc., the sound generation part 170 generates various kinds of sounds, outputs them to the sound output part 172, and the function, It is realizable by hardwares, such as ASIC for sound generation, CPU, or DSP, and a given program (sound generating program) and sound information (data point etc.).

[0026]The communications department 174 performs various kinds of control for communicating between external devices (for example, a host device and other game systems), and can realize the function by hardwares, such as ASIC for communication, or CPU, and a given program (communications program).

[0027]It may be made to distribute the information for realizing processing of this invention (this embodiment) to the information storage medium 150 via a network and the communications department 174 from the information storage medium which a host device (server) has. Use of the information storage medium of such a host device (server) is also included within the limits of this invention.

[0028]The function of the image generation part 160, the sound generation part 170, or the communications department 174 may be made to realize a part or all of a function of the treating part 100. Or the function of the treating part 100 may be made to realize a part or all of a function of the image generation part 160, the sound generation part 170, or the communications department 174.

[0029]The I/F part 176 follows the directions from the treating part 100, etc., and is memory card (in a broad sense.). It becomes an interface for exchanging information between the portable information storage devices 180 containing a handheld game machine etc., and the slot for inserting memory card, controller data writing, IC for read-out, etc. can realize the function. When realizing information exchange between the memory card 180 using radio, such as infrared rays, hardwares, such as a semiconductor laser and an infrared sensor, can realize the function of the I/F part 176.

[0030]The treating part 100 contains the game operation part 110.

[0031]The game operation part 110 here The managing acceptance of coin (price), the setting processing in the various modes, advance processing of a game, the setting processing of a selection picture, and an object (a character.) The processing which determines the position and angle (circumference angle of rotation of an axis) of a mobile, the processing which determines a view position and a look angle, The processing which reproduces the motion of an object, the processing which arranges an object to object space, Hit check processing, the processing which calculates a game result (a result, results), processing for two or more players to play in common game space, Or game computation processing of versatility, such as game exaggerated processing, is performed based on the manipulation data from the final controlling element 130, the data from the memory card 180, a game program, etc.

[0032]The game operation part 110 contains the replay data generating part 112, the packet treating part 114, the replay treating part 120, and the virtual camera treating part 124.

[0033]Here, the replay data generating part 112 performs processing which generates the replay data (candidate of replay data who memorizes) memorized to the replay data storage part (replay buffer) 142. The manipulation routine which more specifically controls the object (a character, a mobile) which a player operates, for example, the manipulation routine which controls the object which a computer operates, etc. function as this replay data generating part 112. That is, when an object moves by operation of a player, or operation of a computer, the above-mentioned manipulation routine will generate position data and angle (direction) data of an object after movement. And the generated replay data will be inputted into the packet treating part 114.

[0034]And in this embodiment, the replay data generating part 112 contains the lock on judgment part 113. Processing which judges whether the lock on judgment part 113 has here the enemy object by which lock on (it catches in a broad sense) was carried out in two or more enemy objects is performed. And the decision result is outputted to the packet treating part 114 as replay data.

[0035]The packet treating part 114 receives the replay data which the replay data generating part 112 generated, and performs processing which writes required replay data in the replay data storage part 142, and makes it memorize by packet format.
[0036]More specifically, the packet treating part 114 contains the judgment part 116, the compression zone 117, the assembly part 118, and the writing part 119. And the judgment part 116 judges whether the replay data from the replay data generating part 112 should be memorized to the replay data storage part 142. for example, the element data (position data, angular data, and an animation number.) of replay data The value in the last frames, such as a display and a non-display flag of an object, a model number, or virtual camera alteration data, is compared with the value in the frame concerned, and it is made to memorize to the replay data storage part 142 about the element data to which the value changed from the last frame.
[0037]The compression zone 117 performs processing for compressing replay data. Position data and angular data which reduced the number of bits of the position data of the object in the inside of a game or angular data and in which the number of bits was more specifically reduced are memorized by the replay data storage part 142. In this case, the reduction number of bits (rate of a bit cutback) of angular data is made less than the reduction number of bits of position data. By doing in this way, the situation where an object does not carry out direction change smoothly can be prevented from arising in a replay picture.
[0038]The assembly part 118 performs processing which assembles the packet about replay data. That is, a header (packet length, classification data) is added to a data body, and a packet is assembled (it is processed).
[0039]The writing part 119 performs processing which writes the packet assembled by the assembly part 118 in the replay data storage part 142. That is, 1 or two or more packets required for replay processing of the frame concerned are written in the replay data storage part 142 as replay data corresponding to the frame concerned.
[0040]The replay treating part 120 reads the replay data memorized by the replay data storage part 142, and performs the various replay processings for generating a replay picture. For example, based on position data and angular data which the number of bits was reduced and were memorized, replay processing of an object in which the position and angle are specified with these position data and angular data is performed.
[0041]The replay treating part 120 contains the read section 122 and the treating part 123. Here, the read section 122 performs processing which reads the packet of replay data from the replay data storage part 142. And the treating part 123 performs replay processing specified with the classification data contained in the packet of this read replay data.
[0042]The virtual camera treating part 124 performs the various processings about a virtual camera.
[0043]For example, the position and angle (direction) of a virtual camera are controlled to follow the player object which moves by operation of a player into a game. And the picture which is in sight from this virtual camera is generated by the image generation part 160.
[0044]On the other hand, into replay, one virtual camera is chosen at random, for example from the virtual cameras for two or more replay (virtual camera manipulation routine). And the selected position and angle of a virtual camera are controlled by a given algorithm, and the picture which is in sight from this virtual camera comes to be generated by the image generation part 160.
[0045]The virtual camera treating part 124 contains the virtual camera changing part 126. The virtual camera changing part 126 performs here processing which changes the virtual camera used for generation of a replay picture based on the virtual camera alteration data contained in the replay data memorized by the replay data storage part 142. When virtual camera alteration data is not contained in replay data, more specifically, processing which changes the usual virtual camera at random is performed (when the lock on of the enemy object is not carried out). On the other hand, when virtual camera alteration data is contained in replay data, the virtual camera used for generation of a replay picture is changed into the virtual camera for lock on (when the lock on of the enemy object is carried out), and processing which changes the virtual camera for these lock on at random is performed.

[0046]As a virtual camera for these lock on, For example, the virtual camera which turns to the direction of an enemy object (enemy object by which lock on was carried out) from a player object (or viewpoint of a player), The virtual camera (for example, virtual camera which turns to the direction of a player object from an enemy object) around an enemy object, etc. can be considered.
[0047]Even if change of a virtual camera is directed, he is trying not to change a virtual camera in this embodiment, until a given period passes, after a virtual camera is changed based on virtual camera alteration data. By doing in this way, a virtual camera changes frequently and the situation where an unsightly replay picture will be generated can be effectively prevented now.
[0048]In the game system of this embodiment, both the game play by the single handicap player mode which one person's player plays, and the game play by the multiplayer mode which two or more players play are possible.
[0049]When two or more players play, the game image and game sound with which two or more of these players are provided may be generated using one terminal, and may be generated using two or more terminals connected in the network (a transmission line, a communication line) etc.
[0050]2. The 1st feature of the feature book embodiment of this embodiment, When an enemy object changes into a lock on state (a broad sense seized condition), virtual camera alteration data is memorized as replay data, and it is in the point of changing the virtual camera used for generation of a replay picture, based on the memorized virtual camera alteration data.
[0051]For example, in drawing 2, the player object 10 provides the aim in the enemy object 16 in two or more enemy objects 12, 14, and 16, and the lock on of the enemy object 16 is carried out. According to this embodiment, if the enemy object 16 will be in a lock on state in this way, virtual camera alteration data will be written in a replay data storage part, and will be memorized.

[0052]When the lock on of the enemy object is not carried out, as shown in E1 of drawing 3, more specifically, virtual camera CA for the usual replay, CB, CC, CD, and CE change at random. For example, based on the virtual camera change table stored in a storage parts store, a virtual camera changes from CE from CC from CA, and CC, and CE at random like CD from CB and CB. Thereby, the player can see the situation of an own game play now from different various viewpoints from the inside of a game.
[0053]On the other hand, when the lock on of the enemy object is carried out, as shown in E2 of drawing 3, the virtual camera used for generation of a replay picture is changed into CP for lock on, and GQ from CA-CE. And the virtual cameras CP and GQ are changed at random, and a replay picture is generated.
[0054]Here, virtual camera CP is a virtual camera by which the position or angle (angle of rotation of the circumference of X, Y, or the Z-axis) is controlled to turn to the direction of the enemy object 16 by which lock on is carried out from the player object 10 (or viewpoint of a player). According to this virtual camera CP, a replay picture as shown, for example in drawing 4 (A) is generable. And the player which looked at this replay picture can know now (whether it was observing) for which enemy object the player was aiming at in the game. And the situation which will become the way of being visible depending on which replay pictures also differed if the enemy object which the player was aiming at is different, and a replay picture is uniformalized and becomes monotonous can be prevented.
[0055]Virtual camera GQ is a virtual camera by which the position or angle is controlled to be installed around the enemy object 16, for example, to turn to the direction of 16 to an enemy object or the player object 10 (or player viewpoint). According to this virtual camera GQ, a replay picture as shown, for example in drawing 4 (B) is generable. And according to this replay picture, the player can see now the situation of the player object 10 which is visible from the direction of the enemy object 16. Namely, it becomes possible to see signs that the player object 10 attacks the enemy object 16, and it can generate now a replay picture with unprecedented force.
[0056]In the conventional game system, that the virtual camera which generates a replay picture was beforehand decided to be was always used (E1 reference of drawing 3). That is, the decided virtual camera only changed, without depending on the game operation of the player in the inside of a game. For this reason, the replay picture generated became monotonous and uniform.

[0057]On the other hand, in this embodiment, it becomes that from which which enemy object the player aimed at responded, and the replay picture generated differed.

[0058]For example, if the lock on of the enemy object 16 is carried out targeting the enemy object 16, a player, The replay picture (refer to drawing 4 (A)) in the virtual camera which turns to the direction of the enemy object 16 from the player object 10, and the replay picture (refer to drawing 4 (B)) which is in sight from the direction of the enemy object 16 come to be generated. The replay picture in the virtual camera with which a player will turn to the direction of the enemy object 12 from the player object 10 if the lock on of the enemy object 12 is carried out targeting the enemy object 12, and the replay picture which is in sight from the direction of the enemy object 12 come to be generated. thus, according to this embodiment, it comes to be changed according to the game operation (operation which aims at an enemy object) of a player, and how where the replay picture generated is in sight can boil the degree of variety of a replay picture markedly, and can increase it.

[0059]In this embodiment, it is judged whether the lock on of the enemy object was carried out based on the position data (or direction data) of a player object, the position data of an enemy object, etc. In other words, based on the position data of a player object (the 1st object), and the position data of an enemy object (the 2nd object), When it is judged that given physical relationship is between a player object and an enemy object, it judges that the lock on of the enemy object is carried out, and virtual camera alteration data is memorized as replay data. And based on this virtual camera alteration data, the virtual camera used for generation of a replay picture is changed.

[0060]Thus, if it judges that given physical relationship is between objects based on position data and the virtual camera in replay processing is changed based on the decision result, It becomes possible to make the position data of an object which changes to real time into a game according to the game operation of a player reflect in control of a virtual camera. thereby, the degree of variety of a replay picture can be boiled markedly, and can be increased.

[0061]The 2nd feature of this embodiment is as follows. Namely, in this embodiment, a packet required for replay processing of the frame concerned is judged in the packet used for replay processing, The packet judged to be required is related with the frame concerned, it memorizes as replay data, and replay processing of each frame is performed based on the packet of the memorized replay data. And in this embodiment, virtual camera alteration data is memorized to the replay data storage part as one of the packets for replay processing memorized in this way.

[0062]For example, in drawing 5 each packet processing routines alumnus, RE, and AC and EV of an object control system, a replay control system, an action control system, and an event control system, In each frame, the packet which judged which packet is required because of replay processing, and was judged to be required is assembled, and it memorizes to a replay data storage part (replay buffer).

[0063]The packets alumnus, RE, and AC which packet manipulation-routine alumnus, RE, AC, and EV assemble, and EV are the packets of an object (object which player or computer operates) control system, a replay control system, an action control system, and an event control system respectively. Action means here that an object generates the thing (attack things, such as a cartridge) which affects other objects. An event means that an object generates the things (smoke, sparks, etc.) which do not affect other objects, or he changes. Or it says that a map object is substituted (partial substitution of a map).

[0064]For example, packet alumnus who changes the position of ** object, and an angle with the frame K in drawing 5, ** Packet alumnus who changes a display and un-displaying of an object, packet alumnus who changes ** model number, ** The packet AC which generates the cartridge A (cartridge with which movement magnitude and angle of rotation serve as regularity or immobilization to disappearance). ** The packet AC which generates the cartridge B (cartridge from which movement magnitude and angle of rotation change for every frame to disappearance). ** The packet EV which generates the effect A (effect which carries out neither movement nor rotation), and the packet RE which directs the end of ** frame are assembled, and the replay data storage part memorizes as a packet of the frame K.

[0065]That is, in the frame K, since position data and angular data of the object (object which a player or a computer operates) changed, it is judged that the packet which changes a position and an angle is required, and this packet is memorized by the replay data storage part. Similarly, since the display and the non-display flag, and the model number also changed, it is judged that the packet which changes a display and un-displaying, and a model number is required, and a replay data storage part memorizes. Since the cartridge A, the cartridge B, and the effect A occurred, it is judged that the packet which generates the cartridge A, the cartridge B, and the effect A is required, and a replay data storage part memorizes.

[0066]Packet alumnus who changes the position of ** object, and an angle with the frame K+1 similarly, ** The packet RE (packet containing virtual camera alteration data) which changes a virtual camera, and the packet RE which directs the end of ** frame are judged to be required, these packets are assembled, and a replay data storage part memorizes.

[0067]Packet alumnus who changes the animation number of ** object in the frame K+2, ** The packet AC which extinguishes the packet AC which extinguishes the cartridge A, and the ** cartridge B. ** The packet EV which generates the effect B (effect which moves or rotates), the packet EV which substitutes ** map object, and the packet RE which directs the end of ** frame are judged to be required, these packets are assembled, and a replay data storage part memorizes.

[0068]And each packet memorized by the replay data storage part in this way is read to replay manipulation-routine alumnus, RE, AC, and EV. And each replay manipulation-routine alumnus, RE, AC, and EV will perform each replay processing according to these read packets.

[0069]Here the packets alumnus, RE, and AC and EV of an object control system, a replay control system, an action control system, and an event control system, Respectively, it will be read to replay manipulation-routine alumnus of an object control system, a replay control system, an action control system, and an event control system, RE, AC, and EV.

[0070]And each packets alumnus, RE, and AC to each replay manipulation-routine alumnus, RE, AC, and EV and classification of EV will be performed based on the classification data added to the header of the packet, as shown in drawing 6. In the case of the assembly of a packet, packet manipulation-routine alumnus, RE, AC, and EV add this classification data to the header of a packet, and memorize it to a replay data storage part. Since the packet of this embodiment is variable length, packet length is also added to the header of the packet.

[0071]This classification data added to the header of a packet is data for classifying a packet into the packets alumnus, RE, and AC and EV. This classification data functions also as each packets alumnus, RE, and AC and detailed classification data of EV. For example, packet alumnus is further classified into the packet which (1) object is located and changes an angle, the packet which changes (2) displays and un-displaying, the packet which changes (3) model numbers, the packet which changes (4) animation number, etc. Replay manipulation-routine alumnus who received packet alumnus can know now whether packet alumni who received are which these packets based on the classification data contained in packet alumnus.

[0072]Since it judges which packet is required in each frame and only the required packet was memorized to the replay data storage part according to the technique of drawing 5 as mentioned above, replay data can be memorized efficiently without futility to a replay data storage part.

[0073]That is, the technique of always fixing to a replay data storage part the frame of the data memorized with each frame as one technique of memorizing replay data can be considered. According to this technique, the writing control of the replay data to a replay data storage part can be simplified. However, in this technique, also with a frame with much quantity of the replay data which should be memorized, the replay data of the always same data volume will come to be memorized also with few frames, and the operating storage capacity of a replay data storage part will increase.

[0074]On the other hand, many packets are memorized by the replay data storage part with a frame (for example, the frame K of drawing 5) with much quantity of the replay data which should be memorized in the technique of drawing 5. Few packets come to be memorized with a frame (for example, frame K+1 of drawing 5) with little quantity of the replay data which should be memorized. Therefore, replay data can be memorized now efficiently [there is no futility in a replay data storage part, and].

[0075]When the situation where a new kind of replay data must be memorized, for example when change arises in the specification of the replay data which should be memorized arises, this can be coped with easily and there is also an advantage that extendibility is very high in the technique of drawing 5.

[0076]For example, in order to generate the replay picture of drawing 4 (A) and (B), also when the necessity of introducing the replay data of the new kind of virtual camera alteration data arises, this can be coped with easily. In such a case, it is because what is necessary is just to newly define the packet containing this virtual camera alteration data.

[0077]The 3rd feature of this embodiment is at the point that virtual camera alteration data is memorized as replay data, on condition that the value changed from the last frame.

[0078]For example, in this embodiment, if the lock on of the enemy object is carried out, a lock on flag (a broad sense one of the virtual camera alteration data) will be set to 1, and if lock on is canceled, a lock on flag will be reset by 0.

[0079]And as shown in drawing 7, in this embodiment, lock on begins, and a lock on flag is set to 1, or, Only when lock on is canceled, a lock on flag is reset by 0 and change arises in virtual camera alteration data (the frame K, frame K+L, frame K+M), virtual camera alteration data is memorized as replay data. On the other hand, a lock on flag does not change and virtual camera alteration data is not memorized by ** which change does not produce in virtual camera alteration data at a replay data storage part.

[0080]Thus, if virtual camera alteration data is memorized only when it changes from the last frame, relative redundancy of the replay data memorized by the replay data storage part can be made low, and the quantity of the data which should be memorized to a replay data storage part can be compressed effectively.

[0081]The element data of others other than virtual camera alteration data in this embodiment, For example, the position data of an object, the angular data of an object, the model number of an object, He is trying to memorize as replay data also about the animation number in animation processing (peak animation processing) of an object, or a display, a non-display flag, etc. of an object, on condition that it changed from the last frame. thereby, the operating storage capacity of a replay data storage part is boiled markedly, and can be saved now.

[0082]The 4th feature of this embodiment is that it makes a change of a virtual camera disapproval, even if change of a virtual camera is directed after the virtual camera was changed based on virtual camera alteration data until a given period passes (even if virtual camera alteration data is memorized).

[0083]For example, in drawing 8, if the lock on of the enemy object is carried out into a game as shown in F1, as shown in F2, a virtual camera will be changed in replay processing.

[0084]However, in this embodiment, once a virtual camera is changed in this way, change of a virtual camera will become disapproval until given period TC passes. For example, even if lock on newly arises like F2, F3, and F4, change processing of a virtual camera is not performed. And if lock on arises after given period TC's passing as shown in F5, a virtual camera will be changed as shown in F6.

[0085]That is, when the technique of drawing 8 was not adopted and the lock on to an enemy object arises repeatedly for a short time, a virtual camera will change frequently (the picture of drawing 4 (A) and (B) changes frequently), and the replay picture generated will become very unsightly.

[0086]On the other hand, if the technique of drawing 8 is adopted, change of a virtual camera will become disapproval until given period TC passes. Therefore, also when the lock on to an enemy object arises repeatedly for a short time, it is natural and the replay picture which a virtual camera will not change frequently and is generated can be made into that comfortable.

[0087]3. Explain the detailed detailed example of processing of this embodiment, next this embodiment using the flow chart of drawing 9, drawing 10, and drawing 11.

[0088]First, based on the position data of a player object, and the position data of an enemy object, lock on (prehension) decision processing is performed and an enemy object judges whether only the given frame number entered in lock on area (Step S1, S2). And when it enters, a lock on flag is set to 1 (Step S3).

[0089]That is, as shown in drawing 12, in this embodiment, the lock on area 40 is set up based on position PM, direction DMs (the direction of shooting, etc.), given distance DL, and the given angle (solid angle) alpha of the player object 10. And based on position PE of the enemy object 16, the enemy object 16 judges whether only the given frame number entered in the lock on area 40. And when it enters, a lock on flag is set to 1.

[0090]When it is judged that the enemy object is not contained in lock on area, the enemy object by which lock on had already been carried out judges whether it came out of lock on area (step S4). And when it comes outside, a lock on flag is reset to 0 (Step S5).

[0091]Next, it is judged whether the lock on flag changed from the last frame (Step S6). And when not changing, virtual camera alteration data is not remembered that drawing 7 explained by the replay data storage part.

[0092]On the other hand, when a lock on flag changes, it is judged how the lock on flag changed (Step S7). And when a lock on flag changes to 1 from 0 (when lock on newly begins). The virtual camera alteration data containing ID (identification data) of a player object and ID of an enemy object by which lock on is carried out is memorized to a replay data storage part by packet format (refer to drawing 5) (Step S8). On the other hand, when a lock on flag changes to 0 from 1, the virtual camera alteration data containing ID which shows ID and those without lock on of a player object is memorized to a replay data storage part by packet format (step S9). (when lock on is canceled)

[0093]Drawing 11 is a flow chart at the time of replay processing.

[0094]First, replay data is read from a replay data storage part (Step T1). And it is judged whether the virtual camera alteration data contained in the read replay data contains ID which shows those without lock on (Step T2). And when contained, ID which shows ID and those without lock on of a player object is passed to a virtual camera treating part (virtual camera manipulation routine) (step T3). Then, a virtual camera treating part performs processing which changes the usual virtual camera at random, as shown in E1 of drawing 3 (Step T4). On the other hand, when ID which shows those without lock on is not included, ID of a player object and ID of an enemy object are passed to a virtual camera treating part (Step T5). Then, a virtual camera treating part performs processing which changes the virtual camera for lock on at random, as shown in E2 of drawing 3.

[0095]By making it above, when the lock on of the enemy object is carried out in a game, the virtual camera used for generation of a replay picture comes to be changed into the virtual camera for lock on.

[0096]4. An example of hardware constitutions, next the composition of the hardware which can realize this embodiment is explained using drawing 13. In the system shown in the figure, CPU1000, ROM1002, RAM1004, information-storage-medium 1006, and sound generation IC1008, image generation IC1010, and I/O Ports 1012 and 1014 are mutually connected by the system bath 1016 so that data transmission and reception is possible. And the display 1018 is connected to said image generation IC1010, the loudspeaker 1020 is connected to sound generation IC1008, the control apparatus 1022 is connected to I/O Port 1012, and the communication apparatus 1024 is connected to I/O Port 1014.

[0097]Image data for the information storage medium 1006 to express a program and a display thing, sound data, etc. are mainly stored. For example, in a home game system, DVD, a game cassette, CDROM, etc. are used as an information storage medium which stores a game program etc. In a business-use game system, memories, such as ROM, are used and the information storage medium 1006 is set to ROM1002 in this case.

[0098]The control apparatus 1022 is a device for inputting into the main part of a system the result of the judgment which is equivalent to a game controller, a navigational panel, etc., and a player performs according to game progress.

[0099]According to the program stored in the information storage medium 1006, the system programs (initialization information of the main part of a system, etc.) stored in ROM1002, the signal inputted by the control apparatus 1022, etc., CPU1000 performs control of the whole system, and various data processing. RAM1004 is a memory measure used as workspace of this CPU1000, etc., and the information storage medium 1006, the given contents of ROM1002, or the result of an operation of CPU1000 is stored. The data structure with the logical composition for realizing this embodiment will be built on this RAM or an information storage medium.

[0100]Sound generation IC1008 and image generation IC1010 are provided in this kind of system, and the suitable output of a game sound or a game image can be performed now in it. Sound generation IC1008 is an integrated circuit which generates game sounds, such as a sound effect and background music, based on the information memorized by information-storage-medium 1006 and ROM1002, and the generated game sound is outputted by the loudspeaker 1020. Image generation IC1010 is an integrated circuit which generates the pixel information for outputting to the display 1018 based on the picture information sent from RAM1004, ROM1002, and information-storage-medium 1006 grade. As the display 1018, what is called what is called a head mount display (HMD) can also be used.

[0101]It is used for exchanging with the exterior various kinds of information used inside a game system, being connected with other game systems, and the communication apparatus 1024 sending and receiving the given information according to a game program, or sending and receiving information, including a game program etc., via a communication line etc.

[0102]And various processings in which it explained by drawing 1 - drawing 12 are realized by CPU1000, image generation IC1010, or the sound generation IC1008 grade which operates based on the information storage medium 1006 which stored the information on a program, data, etc., the information from this information storage medium 1006, etc. CPU1000 or general-purpose DSP may perform by software processing performed in image generation IC1010 and sound generation IC1008 grade.

[0103]The example at the time of applying this embodiment to a business-use game system is shown in drawing 14 (A). Looking at the game image projected on the display 1100, a player operates the lever 1102 and button 1104 grade, and enjoys a game. CPU, image generation IC, sound generation IC, etc. are mounted in the system board (circuit board) 1106 built in. And the information for performing processing (means of this invention) of this embodiment (realization) is stored in the semiconductor memory 1108 which is an information storage medium on the system board 1106. Hereafter, this information is called stored information.

[0104]The example at the time of applying this embodiment to a game system for home use is shown in drawing 14 (B). Looking at the game image projected on the display 1200, a player operates the game controllers 1202 and 1204 and enjoys a game. In this case, the above-mentioned stored information is stored in DVD1206 which is an information storage medium which can be freely detached and attached to a body system, the memory card 1208, and 1209 grades.

[0105]drawing 14 (C) -- the host device 1300, this host device 1300, and a communication line (a small-scale network like LAN.) The example at the time of applying this embodiment is shown in the game system containing the terminal 1304-1 connected via the wide area network 1302 like the Internet - 1304-n. In this case, the above-mentioned stored information is stored in the information storage media 1306, such as a magnetic disk drive with the controllable host device 1300, a magnetic tape handler, and semiconductor memory, for example. When the terminal 1304-1 - 1304-n are what has CPU, image generation IC, and sound processing IC, and can generate a game image and a game sound by a stand-alone, From the host device 1300, the game program for generating a game image and a game sound, etc. are delivered by the terminal 1304-1 - 1304-n. On the other hand, when ungenerable by a stand-alone, a game image and a game sound are generated, and the host device 1300 will transmit this to the terminal 1304-1 - 1304-n, and will output in a terminal.

[0106]In the composition of drawing 14 (C), a host device (server) and a terminal distribute, and it may be made to process processing of this invention to it. It distributes to the information storage medium of a host device (server), and the information storage medium of a terminal, and may be made to store the above-mentioned stored information for realizing this invention.

[0107]The terminal linked to a communication line may be a home game system, and may be a business-use game system. And when connecting a business-use game system to a communication line, the exchange of information is possible between business-use game systems, and it is desirable to use the portable information storage device (memory card, handheld game machine) also between home game systems which can exchange information.

[0108]What [not only] was explained by the above-mentioned embodiment but various modification implementation is possible for this invention.

[0109]For example, in the invention which relates to a dependent claim among this inventions, it can also have composition which omits some constituent features of the claim of the subordinate point. The important section of the invention concerning the independent claim of 1 of this invention can also be subordinated to other independent claims.

[0110]By this embodiment, when an enemy object changed into a lock on state, the technique of memorizing virtual camera alteration data was explained. However, the seized condition in this invention is not limited to such a lock on state, but can consider various states. For example, a virtual camera is possessed and it moves in the inside of game space, and with the virtual camera, the object (character) which a player operates photos the monster in game space, etc., and considers the game which displays the photoed picture or is printed. In such a game, photography of the monster by a virtual camera is equivalent to prehension of this invention.

[0111]By this embodiment, when the 2nd object was in a seized condition, virtual camera alteration data was memorized as replay data, and the technique of changing the virtual camera used for generation of a replay picture was mainly explained. However, when not only action called prehension but various actions produce this invention between the 1st and 2nd object, or when this action becomes possible, and when, Virtual camera alteration data is memorized as replay data, and it can apply also to the technique of changing the virtual camera used for generation of a replay picture widely.

[0112]For example, in a fishing game as shown in drawing 15 (A), the case where action called a hit arises between the lure 52 and the fish 50 which the angler gave up (between the 1st and 2nd object) is considered (or when action called a hit becomes possible). In this case, as shown in drawing 15 (A), the virtual camera for replay is changed into the virtual camera (virtual camera arranged around the fish 50) seen from the fish 50 side, and the replay picture which is in sight from this virtual camera is generated.

[0113]In a baseball game as shown in drawing 15 (B), a batter hits the ball 62, and the case where action called a catch arises between the ball 62 (or batter) and the outfielder 60 is considered (when action called a catch becomes possible). In this case, as shown in drawing 15 (B), the virtual camera for replay is changed into the virtual camera (virtual camera arranged around the outfielder 60) seen from the outfielder 60 side, and the replay picture which is in sight from this virtual camera is generated.

[0114]In a soccer game as shown in drawing 16, the player 71 kicks the ball 72, and the case where action called a path arises between the ball 72 (or player 71) and the player 70 is considered (when action called a path becomes possible). In this case, as shown in drawing 16, the virtual camera for replay is changed into the virtual camera (virtual camera arranged around the player 70) seen from the player 70 side, and the replay picture which is in sight from this virtual camera is generated.

[0115]As action in this invention, various things, such as attacks (a kick, a punch, shooting, etc.), defense, a collision, and a hit, can be considered besides prehension, a hit, a catch, and a path.

[0116]Whether between the 1st and 2nd object, action arose or action became possible is investigating whether given physical relationship being between the 1st and 2nd object based on the position data of the 1st and 2nd object, and judging is desirable. For example, in drawing 15 (A), it is judged whether action called a hit arose based on the lure 52 and the position data of the fish 50. In drawing 15 (B), it is judged whether action called a catch arose based on the ball 62 and the outfielder's 60 position data. In drawing 16, it is judged whether action called a path arose based on the ball 72 (or player 71) and the player's 70 position data.

[0117]However, change of thinking of the fish 50 in the algorithm which controls action of the fish 50 is detected, and it may be made to, memorize virtual camera alteration data in drawing 15 (A) for example. That is, when it is thought that the fish 50 will bite the lure 52, virtual camera alteration data is memorized, and the virtual camera at the time of replay is changed. Similarly, in drawing 15 (B) and drawing 16, change of thinking with the algorithm which controls the action of the outfielder 60 and the player 70 is detected, virtual camera alteration data is memorized, and the virtual camera at the time of replay is changed.

[0118]This invention is applicable to various games (sports games, a vehicle game, a flight simulation game, a fighting game, a competitive game, a robot versus fighting game, a role playing game, a music performance game, a dance game, etc.) besides a shooting game.

[0119]This invention is applicable to various game systems, such as a system board which generates a business-use game system, a home game system, the large-sized attraction system with which many players participate, a simulator, a computer terminal for multimedia services, an image generation system, and a game image.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention]This invention relates to a game system and an information storage medium.

[Translation done.]

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TECHNICAL PROBLEM

Background Art and Problem(s) to be Solved by the Invention]The game system which can enjoy a shooting game, sports games, a fighting game, etc. is known looking at the game image projected on the screen conventionally. The function called a replay function is usually provided in such a game system.
A player can be seen now from a viewpoint which is different from the inside of a game after a game end in the situation of an own game play by using this replay function.
As conventional technology of the game system which has such a replay function, there are some which are indicated by international publication number WO96/00601, for example.
[0003]However, in the old game system which has a replay function, that the virtual camera which generates a replay picture was beforehand decided to be was always used. For this reason, influence of the game play of the player in the inside of a game, etc. were not able to be reflected in the replay picture. Therefore, the generated replay picture became uniform by monotone more, and was not able to increase the degree of variety of the replay picture.
[0004]The place which it is made in order that this invention may solve the above technical problems, and is made into the purpose loses the monotony of a replay picture, and there is in providing the game system and information storage medium which can increase the degree of variety of a replay picture.

[Translation done.]

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MEANS

[Means for Solving the Problem]In order to solve an aforementioned problem, this invention is characterized by that a game system for generating a game image comprises:
A means which is written in a replay data storage means by using virtual camera alteration data as replay data, and is made to memorize when the 2nd object in two or more objects is in a seized condition into a game.
A means to change a virtual camera used for generation of a replay picture based on said virtual camera alteration data contained in memorized replay data.
An information storage medium concerning this invention includes information (program) for being an usable information storage medium and realizing the above-mentioned means by computer (execution). A program concerning this invention is characterized by being a program for being an usable program and realizing the above-mentioned means by computer (execution).
[0006]According to this invention, if the 2nd object will be in a seized condition, virtual camera alteration data will be memorized as replay data. And based on this virtual camera alteration data, a virtual camera is changed at the time of replay processing (a change, selection). If it does in this way, it comes to be visible to that from which a replay picture generated differed by whether the 2nd object was in a seized condition into a game. as a result, monotony of a replay picture is lost, and the degree of variety of a replay picture can be boiled markedly, and can be raised.
[0007]A game system, an information storage medium, and a program concerning this invention are characterized by said seized condition being in a lock on state in a shooting game. If it does in this way, in a replay picture, it can be known now in which object a player provided an aim in a shooting game, and various replay pictures can be expressed.
[0008]This invention is characterized by that a game system for generating a game image comprises:
A means which is written in a replay data storage means by using virtual camera alteration data as replay data, and is made to memorize when action arises between the 1st and 2nd object, or when this action becomes possible.
A means to change a virtual camera used for generation of a replay picture based on said virtual camera alteration data contained in memorized replay data.
An information storage medium concerning this invention includes information (program) for being an usable information storage medium and realizing the above-mentioned means by computer (execution). A program concerning this invention is characterized by being a program for being an usable program and realizing the above-mentioned means by computer (execution).
[0009]According to this invention, if action becomes possible when actions (prehension, a hit, an attack, defense, a collision, or a hit) arise between the 1st and 2nd object or, virtual camera alteration data will be memorized as replay data. And based on this virtual camera alteration data, a virtual camera is changed at the time of replay processing. If it does in this way, by whether action arose between the 1st and 2nd object in a game, and whether action became possible, it comes to be visible to that from which a replay picture generated differed, and the degree of variety of a replay picture can be raised.
[0010]This invention is characterized by that a game system for generating a game image

comprises:
A means which is written in a replay data storage means by using virtual camera alteration data as replay data, and is made to memorize when it is judged that given physical relationship is between the 1st and 2nd object based on position data of the 1st and 2nd object.
A means to change a virtual camera used for generation of a replay picture based on said virtual camera alteration data contained in memorized replay data.
An information storage medium concerning this invention includes information (program) for being an usable information storage medium and realizing the above-mentioned means by computer (execution). A program concerning this invention is characterized by being a program for being an usable program and realizing the above-mentioned means by computer (execution).
[0011]According to this invention, if it is judged based on position data of the 1st and 2nd object that given physical relationship is between the 1st and 2nd object, virtual camera alteration data will be memorized as replay data. And based on this virtual camera alteration data, a virtual camera is changed at the time of replay processing. If it does in this way, by whether given physical relationship arose between the 1st and 2nd object in a game, it comes to be visible to that from which a replay picture generated differed, and the degree of variety of a replay picture can be raised.
[0012]A game system, an information storage medium, and a program concerning this invention, Based on said virtual camera alteration data, a virtual camera used for generation of a replay picture is changed into a virtual camera which turns to a direction of the 2nd object from a viewpoint of the 1st object or a player. If it does in this way, the 2nd object enters in a view and a replay picture which is located near an attention point and is in sight can be generated.
[0013]A game system, an information storage medium, and a program concerning this invention are changed into a virtual camera with which a virtual camera used for generation of a replay picture is arranged around the 2nd object based on said virtual camera alteration data. If it does in this way, a replay picture seen from the 2nd object side can be generated now, and force of a replay picture can be increased.
[0014]A game system, an information storage medium, and a program concerning this invention, In a packet used for replay processing, a packet required for replay processing of the frame concerned is judged, A packet judged to be required writes in a replay data storage means as replay data corresponding to the frame concerned, and is memorized, and said virtual camera alteration data writes in a replay data storage means as one of said the packets, and is memorized. If it does in this way, in order to sort out a packet required for replay processing of the frame concerned and for a replay data storage means to memorize, a replay data storage means can be used efficiently without futility. When change arises in specification of replay data and new replay data needs to be memorized, this can be coped with easily.
[0015]On condition that a game system, an information storage medium, and a program concerning this invention changed from the last frame, virtual camera alteration data is memorized by replay data storage means as replay data. When doing in this way and virtual camera alteration data does not change over a long time, useless data can prevent the situation memorized by replay data storage means. Thereby, an operating storage capacity of a replay data storage means can be saved.
[0016]In a game system, an information storage medium, and a program concerning this invention, even if change of a virtual camera is directed, change of a virtual camera becomes disapproval until a given period passes, after a virtual camera is changed based on said virtual camera alteration data. Also when doing in this way and changing instruction of a virtual camera occurs frequently, since change of a virtual camera becomes disapproval, the situation where a virtual camera changes frequently and a replay picture becomes unsightly can be effectively prevented between given periods.
[0017]
[Embodiment of the Invention]Hereafter, the suitable embodiment of this invention is described using a drawing. Although this invention is explained below taking the case of the case where it applies to a shooting game, this invention is not limited to this but can be applied to various games.

[0018]1. An example of the block diagram of this embodiment is shown in the lineblock diagram 1. this embodiment just containing the treating part 100 (or -- the treating part 100, the storage parts store 140 or the treating part 100, the storage parts store 140, and the information storage medium 150 are included -- ****ing), and at least, it in the figure, About the other block (for example, the final controlling element 130, the image generation part 160, the indicator 162, the sound generation part 170, the sound output part 172, the communications department 174, the I/F part 176, memory card 180 grade), it can be considered as arbitrary components.

[0019]The treating part 100 performs processing of various kinds, such as control of the whole system, directions of the command to each block in a system, and game computation, here, and the function, It is realizable by hardwares, such as CPU (a CISC type, a RISC type), DSP, or ASIC (gate array etc.), and a given program (game program).

[0020]The final controlling element 130 is for a player to input manipulation data, and the function can realize it by hardwares, such as a lever, a button, a cross key, and a housing.

[0021]The storage parts store 140 serves as work regions, such as the treating part 100, the image generation part 160, the sound generation part 170, the communications department 174, and the I/F part 176, and can realize the function by hardwares, such as RAM.

[0022]The information storage medium (it is an usable storage by a computer) 150, The information on a program, data, etc. is stored and hardwares, such as an optical disc (CD, DVD), a magneto-optical disc (MO), a magnetic disk, a hard disk, magnetic tape, or semiconductor memory (ROM), can realize the function. The treating part 100 performs processing of the versatility of this invention (this embodiment) based on the information stored in this information storage medium 150. That is, various information (a program, data) for realizing the means (block included especially in the treating part 100) of this invention (this embodiment) (execution) is stored in the information storage medium 150.

[0023]A part or all of information that is stored in the information storage medium 150 will be transmitted to the power up to a system, etc. at the storage parts store 140. The information memorized by the information storage medium 150, At least one, such as the program code for processing this invention, picture information, sound information, configuration information of a display thing, table data, list data, player information, information for directing processing of this invention, information for processing according to the directions, is included.

[0024]According to the directions from the treating part 100, etc., the image generation part 160 generates various kinds of pictures, outputs them to the indicator 162, and the function, It is realizable by hardwares, such as ASIC for image generation, CPU, or DSP, and a given program (image generation program) and picture information.

[0025]According to the directions from the treating part 100, etc., the sound generation part 170 generates various kinds of sounds, outputs them to the sound output part 172, and the function, It is realizable by hardwares, such as ASIC for sound generation, CPU, or DSP, and a given program (sound generating program) and sound information (data point etc.).

[0026]The communications department 174 performs various kinds of control for communicating between external devices (for example, a host device and other game systems), and can realize the function by hardwares, such as ASIC for communication, or CPU, and a given program (communications program).

[0027]It may be made to distribute the information for realizing processing of this invention (this embodiment) to the information storage medium 150 via a network and the communications department 174 from the information storage medium which a host device (server) has. Use of the information storage medium of such a host device (server) is also included within the limits of this invention.

[0028]The function of the image generation part 160, the sound generation part 170, or the communications department 174 may be made to realize a part or all of a function of the treating part 100. Or the function of the treating part 100 may be made to realize a part or all of a function of the image generation part 160, the sound generation part 170, or the communications department 174.

[0029]The I/F part 176 follows the directions from the treating part 100, etc., and is memory card (in a broad sense.). It becomes an interface for exchanging information between the portable information storage devices 180 containing a handheld game machine etc., and the slot for inserting memory card, controller data writing, IC for read-out, etc. can realize the function. When realizing information exchange between the memory card 180 using radio, such as infrared rays, hardwares, such as a semiconductor laser and an infrared sensor, can realize the function of the I/F part 176.

[0030]The treating part 100 contains the game operation part 110.

[0031]The game operation part 110 here The managing acceptance of coin (price), the setting processing in the various modes, advance processing of a game, the setting processing of a selection picture, and an object (a character.) The processing which determines the position and angle (circumference angle of rotation of an axis) of a mobile, the processing which determines a view position and a look angle, The processing which reproduces the motion of an object, the processing which arranges an object to object space, Hit check processing, the processing which calculates a game result (a result, results), processing for two or more players to play in common game space, Or game computation processing of versatility, such as game exaggerated processing, is performed based on the manipulation data from the final controlling element 130, the data from the memory card 180, a game program, etc.

[0032]The game operation part 110 contains the replay data generating part 112, the packet treating part 114, the replay treating part 120, and the virtual camera treating part 124.

[0033]Here, the replay data generating part 112 performs processing which generates the replay data (candidate of replay data who memorizes) memorized to the replay data storage part (replay buffer) 142. The manipulation routine which more specifically controls the object (a character, a mobile) which a player operates, for example, the manipulation routine which controls the object which a computer operates, etc. function as this replay data generating part 112. That is, when an object moves by operation of a player, or operation of a computer, the above-mentioned manipulation routine will generate position data and angle (direction) data of an object after movement. And the generated replay data will be inputted into the packet treating part 114.

[0034]And in this embodiment, the replay data generating part 112 contains the lock on judgment part 113. Processing which judges whether the lock on judgment part 113 has here the enemy object by which lock on (it catches in a broad sense) was carried out in two or more enemy objects is performed. And the decision result is outputted to the packet treating part 114 as replay data.

[0035]The packet treating part 114 receives the replay data which the replay data generating part 112 generated, and performs processing which writes required replay data in the replay data storage part 142, and makes it memorize by packet format.

[0036]More specifically, the packet treating part 114 contains the judgment part 116, the compression zone 117, the assembly part 118, and the writing part 119. And the judgment part 116 judges whether the replay data from the replay data generating part 112 should be memorized to the replay data storage part 142. for example, the element data (position data, angular data, and an animation number.) of replay data The value in the last frames, such as a display and a non-display flag of an object, a model number, or virtual camera alteration data, is compared with the value in the frame concerned, and it is made to memorize to the replay data storage part 142 about the element data to which the value changed from the last frame.

[0037]The compression zone 117 performs processing for compressing replay data. Position data and angular data which reduced the number of bits of the position data of the object in the inside of a game or angular data and in which the number of bits was more specifically reduced are memorized by the replay data storage part 142. In this case, the reduction number of bits (rate of a bit cutback) of angular data is made less than the reduction number of bits of position data. By doing in this way, the situation where an object does not carry out direction change smoothly can be prevented from arising in a replay picture.

[0038]The assembly part 118 performs processing which assembles the packet about replay data. That is, a header (packet length, classification data) is added to a data body, and a packet is assembled (it is processed).

[0039]The writing part 119 performs processing which writes the packet assembled by the assembly part 118 in the replay data storage part 142. That is, 1 or two or more packets required for replay processing of the frame concerned are written in the replay data storage part 142 as replay data corresponding to the frame concerned.

[0040]The replay treating part 120 reads the replay data memorized by the replay data storage part 142, and performs the various replay processings for generating a replay picture. For example, based on position data and angular data which the number of bits was reduced and were memorized, replay processing of an object in which the position and angle are specified with these position data and angular data is performed.

[0041]The replay treating part 120 contains the read section 122 and the treating part 123. Here, the read section 122 performs processing which reads the packet of replay data from the replay data storage part 142. And the treating part 123 performs replay processing specified with the classification data contained in the packet of this read replay data.

[0042]The virtual camera treating part 124 performs the various processings about a virtual camera.

[0043]For example, the position and angle (direction) of a virtual camera are controlled to follow the player object which moves by operation of a player into a game. And the picture which is in sight from this virtual camera is generated by the image generation part 160.

[0044]On the other hand, into replay, one virtual camera is chosen at random, for example from the virtual cameras for two or more replay (virtual camera manipulation routine). And the selected position and angle of a virtual camera are controlled by a given algorithm, and the picture which is in sight from this virtual camera comes to be generated by the image generation part 160.

[0045]The virtual camera treating part 124 contains the virtual camera changing part 126. The virtual camera changing part 126 performs here processing which changes the virtual camera used for generation of a replay picture based on the virtual camera alteration data contained in the replay data memorized by the replay data storage part 142. When virtual camera alteration data is not contained in replay data, more specifically, processing which changes the usual virtual camera at random is performed (when the lock on of the enemy object is not carried out). On the other hand, when virtual camera alteration data is contained in replay data, the virtual camera used for generation of a replay picture is changed into the virtual camera for lock on (when the lock on of the enemy object is carried out), and processing which changes the virtual camera for these lock on at random is performed.

[0046]As a virtual camera for these lock on, For example, the virtual camera which turns to the direction of an enemy object (enemy object by which lock on was carried out) from a player object (or viewpoint of a player), The virtual camera (for example, virtual camera which turns to the direction of a player object from an enemy object) around an enemy object, etc. can be considered.

[0047]Even if change of a virtual camera is directed, he is trying not to change a virtual camera in this embodiment, until a given period passes, after a virtual camera is changed based on virtual camera alteration data. By doing in this way, a virtual camera changes frequently and the situation where an unsightly replay picture will be generated can be effectively prevented now.

[0048]In the game system of this embodiment, both the game play by the single handicap player mode which one person's player plays, and the game play by the multiplayer mode which two or more players play are possible.

[0049]When two or more players play, the game image and game sound with which two or more of these players are provided may be generated using one terminal, and may be generated using two or more terminals connected in the network (a transmission line, a communication line) etc.

[0050]2. The 1st feature of the feature book embodiment of this embodiment, When an enemy object changes into a lock on state (a broad sense seized condition), virtual camera alteration data is memorized as replay data, and it is in the point of changing the virtual camera used for generation of a replay picture, based on the memorized virtual camera alteration data.

[0051]For example, in drawing 2, the player object 10 provides the aim in the enemy object 16 in two or more enemy objects 12, 14, and 16, and the lock on of the enemy object 16 is carried out. According to this embodiment, if the enemy object 16 will be in a lock on state in this way, virtual camera alteration data will be written in a replay data storage part, and will be memorized.

[0052]When the lock on of the enemy object is not carried out, as shown in E1 of drawing 3, more specifically, virtual camera CA for the usual replay, CB, CC, CD, and CE change at random. For example, based on the virtual camera change table stored in a storage parts store, a virtual camera changes from CE from CC from CA, and CC, and CE at random like CD from CB and CB. Thereby, the player can see the situation of an own game play now from different various viewpoints from the inside of a game.

[0053]On the other hand, when the lock on of the enemy object is carried out, as shown in E2 of drawing 3, the virtual camera used for generation of a replay picture is changed into CP for lock on, and GQ from CA-CE. And the virtual cameras CP and GQ are changed at random, and a replay picture is generated.

[0054]Here, virtual camera CP is a virtual camera by which the position or angle (angle of rotation of the circumference of X, Y, or the Z-axis) is controlled to turn to the direction of the enemy object 16 by which lock on is carried out from the player object 10 (or viewpoint of a player). According to this virtual camera CP, a replay picture as shown, for example in drawing 4 (A) is generable. And the player which looked at this replay picture can know now (whether it was observing) for which enemy object the player was aiming at in the game. And the situation which will become the way of being visible depending on which replay pictures also differed if the enemy object which the player was aiming at is different, and a replay picture is uniformalized and becomes monotonous can be prevented.

[0055]Virtual camera GQ is a virtual camera by which the position or angle is controlled to be installed around the enemy object 16, for example, to turn to the direction of 16 to an enemy object or the player object 10 (or player viewpoint). According to this virtual camera GQ, a replay picture as shown, for example in drawing 4 (B) is generable. And according to this replay picture, the player can see now the situation of the player object 10 which is visible from the direction of the enemy object 16. Namely, it becomes possible to see signs that the player object 10 attacks the enemy object 16, and it can generate now a replay picture with unprecedented force.

[0056]In the conventional game system, that the virtual camera which generates a replay picture was beforehand decided to be was always used (E1 reference of drawing 3). That is, the decided virtual camera only changed, without depending on the game operation of the player in the inside of a game. For this reason, the replay picture generated became monotonous and uniform.

[0057]On the other hand, in this embodiment, it becomes that from which which enemy object the player aimed at responded, and the replay picture generated differed.

[0058]For example, if the lock on of the enemy object 16 is carried out targeting the enemy object 16, a player, The replay picture (refer to drawing 4 (A)) in the virtual camera which turns to the direction of the enemy object 16 from the player object 10, and the replay picture (refer to drawing 4 (B)) which is in sight from the direction of the enemy object 16 come to be generated. The replay picture in the virtual camera with which a player will turn to the direction of the enemy object 12 from the player object 10 if the lock on of the enemy object 12 is carried out targeting the enemy object 12, and the replay picture which is in sight from the direction of the enemy object 12 come to be generated. thus, according to this embodiment, it comes to be changed according to the game operation (operation which aims at an enemy object) of a player, and how where the replay picture generated is in sight can boil the degree of variety of a replay picture markedly, and can increase it.

[0059]In this embodiment, it is judged whether the lock on of the enemy object was carried out based on the position data (or direction data) of a player object, the position data of an enemy object, etc. In other words, based on the position data of a player object (the 1st object), and the position data of an enemy object (the 2nd object), When it is judged that given physical relationship is between a player object and an enemy object, it judges that the lock on of the enemy object is carried out, and virtual camera alteration data is memorized as replay data. And based on this virtual camera alteration data, the virtual camera used for generation of a replay picture is changed.

[0060]Thus, if it judges that given physical relationship is between objects based on position data and the virtual camera in replay processing is changed based on the decision result, It becomes possible to make the position data of an object which changes to real time into a game according to the game operation of a player reflect in control of a virtual camera. thereby, the degree of variety of a replay picture can be boiled markedly, and can be increased.

[0061]The 2nd feature of this embodiment is as follows. Namely, in this embodiment, a packet required for replay processing of the frame concerned is judged in the packet used for replay processing, The packet judged to be required is related with the frame concerned, it memorizes as replay data, and replay processing of each frame is performed based on the packet of the memorized replay data. And in this embodiment, virtual camera alteration data is memorized to the replay data storage part as one of the packets for replay processing memorized in this way.

[0062]For example, in drawing 5 each packet processing routines alumnus, RE, and AC and EV of an object control system, a replay control system, an action control system, and an event control system, In each frame, the packet which judged which packet is required because of replay processing, and was judged to be required is assembled, and it memorizes to a replay data storage part (replay buffer).

[0063]The packets alumnus, RE, and AC which packet manipulation-routine alumnus, RE, AC, and EV assemble, and EV are the packets of an object (object which player or computer operates) control system, a replay control system, an action control system, and an event control system respectively. Action means here that an object generates the thing (attack things, such as a cartridge) which affects other objects. An event means that an object generates the things (smoke, sparks, etc.) which do not affect other objects, or he changes. Or it says that a map object is substituted (partial substitution of a map).

[0064]For example, packet alumnus who changes the position of ** object, and an angle with the frame K in drawing 5, ** Packet alumnus who changes a display and un-displaying of an object, packet alumnus who changes ** model number, ** The packet AC which generates the cartridge A (cartridge with which movement magnitude and angle of rotation serve as regularity or immobilization to disappearance). ** The packet AC which generates the cartridge B (cartridge from which movement magnitude and angle of rotation change for every frame to disappearance). ** The packet EV which generates the effect A (effect which carries out neither movement nor rotation), and the packet RE which directs the end of ** frame are assembled, and the replay data storage part memorizes as a packet of the frame K.

[0065]That is, in the frame K, since position data and angular data of the object (object which a player or a computer operates) changed, it is judged that the packet which changes a position and an angle is required, and this packet is memorized by the replay data storage part. Similarly, since the display and the non-display flag, and the model number also changed, it is judged that the packet which changes a display and un-displaying, and a model number is required, and a replay data storage part memorizes. Since the cartridge A, the cartridge B, and the effect A occurred, it is judged that the packet which generates the cartridge A, the cartridge B, and the effect A is required, and a replay data storage part memorizes.

[0066]Packet alumnus who changes the position of ** object, and an angle with the frame K+1 similarly, ** The packet RE (packet containing virtual camera alteration data) which changes a virtual camera, and the packet RE which directs the end of ** frame are judged to be required, these packets are assembled, and a replay data storage part memorizes.

[0067]Packet alumnus who changes the animation number of ** object in the frame K+2, ** The packet AC which extinguishes the packet AC which extinguishes the cartridge A, and the ** cartridge B. ** The packet EV which generates the effect B (effect which moves or rotates), the packet EV which substitutes ** map object, and the packet RE which directs the end of ** frame are judged to be required, these packets are assembled, and a replay data storage part memorizes.

[0068]And each packet memorized by the replay data storage part in this way is read to replay manipulation-routine alumnus, RE, AC, and EV. And each replay manipulation-routine alumnus, RE, AC, and EV will perform each replay processing according to these read packets.

[0069]Here the packets alumnus, RE, and AC and EV of an object control system, a replay control system, an action control system, and an event control system, Respectively, it will be read to replay manipulation-routine alumnus of an object control system, a replay control system, an action control system, and an event control system, RE, AC, and EV.

[0070]And each packets alumnus, RE, and AC to each replay manipulation-routine alumnus, RE, AC, and EV and classification of EV will be performed based on the classification data added to the header of the packet, as shown in drawing 6. In the case of the assembly of a packet, packet manipulation-routine alumnus, RE, AC, and EV add this classification data to the header of a packet, and memorize it to a replay data storage part. Since the packet of this embodiment is variable length, packet length is also added to the header of the packet.

[0071]This classification data added to the header of a packet is data for classifying a packet into the packets alumnus, RE, and AC and EV. This classification data functions also as each packets alumnus, RE, and AC and detailed classification data of EV. For example, packet alumnus is further classified into the packet which (1) object is located and changes an angle, the packet which changes (2) displays and un-displaying, the packet which changes (3) model numbers, the packet which changes (4) animation number, etc. Replay manipulation-routine alumnus who received packet alumnus can know now whether packet alumni who received are which these packets based on the classification data contained in packet alumnus.

[0072]Since it judges which packet is required in each frame and only the required packet was memorized to the replay data storage part according to the technique of drawing 5 as mentioned above, replay data can be memorized efficiently without futility to a replay data storage part.

[0073]That is, the technique of always fixing to a replay data storage part the frame of the data memorized with each frame as one technique of memorizing replay data can be considered. According to this technique, the writing control of the replay data to a replay data storage part can be simplified. However, in this technique, also with a frame with much quantity of the replay data which should be memorized, the replay data of the always same data volume will come to be memorized also with few frames, and the operating storage capacity of a replay data storage part will increase.

[0074]On the other hand, many packets are memorized by the replay data storage part with a frame (for example, the frame K of drawing 5) with much quantity of the replay data which should be memorized in the technique of drawing 5, Few packets come to be memorized with a frame (for example, frame K+1 of drawing 5) with little quantity of the replay data which should be memorized. Therefore, replay data can be memorized now efficiently [there is no futility in a replay data storage part, and].

[0075]When the situation where a new kind of replay data must be memorized, for example when change arises in the specification of the replay data which should be memorized arises, this can be coped with easily and there is also an advantage that extendibility is very high in the technique of drawing 5.

[0076]For example, in order to generate the replay picture of drawing 4 (A) and (B), also when the necessity of introducing the replay data of the new kind of virtual camera alteration data arises, this can be coped with easily. In such a case, it is because what is necessary is just to newly define the packet containing this virtual camera alteration data.

[0077]The 3rd feature of this embodiment is at the point that virtual camera alteration data is memorized as replay data, on condition that the value changed from the last frame.

[0078]For example, in this embodiment, if the lock on of the enemy object is carried out, a lock on flag (a broad sense one of the virtual camera alteration data) will be set to 1, and if lock on is canceled, a lock on flag will be reset by 0.

[0079]And as shown in drawing 7, in this embodiment, lock on begins, and a lock on flag is set to 1, or, Only when lock on is canceled, a lock on flag is reset by 0 and change arises in virtual camera alteration data (the frame K, frame K+L, frame K+M), virtual camera alteration data is memorized as replay data. On the other hand, a lock on flag does not change and virtual camera alteration data is not memorized by ** which change does not produce in virtual camera alteration data at a replay data storage part.

[0080]Thus, if virtual camera alteration data is memorized only when it changes from the last frame, relative redundancy of the replay data memorized by the replay data storage part can be made low, and the quantity of the data which should be memorized to a replay data storage part can be compressed effectively.

[0081]The element data of others other than virtual camera alteration data in this embodiment, For example, the position data of an object, the angular data of an object, the model number of an object, He is trying to memorize as replay data also about the animation number in animation processing (peak animation processing) of an object, or a display, a non-display flag, etc. of an object, on condition that it changed from the last frame. thereby, the operating storage capacity of a replay data storage part is boiled markedly, and can be saved now.

[0082]The 4th feature of this embodiment is that it makes a change of a virtual camera disapproval, even if change of a virtual camera is directed after the virtual camera was changed based on virtual camera alteration data until a given period passes (even if virtual camera alteration data is memorized).

[0083]For example, in drawing 8, if the lock on of the enemy object is carried out into a game as shown in F1, as shown in F2, a virtual camera will be changed in replay processing.

[0084]However, in this embodiment, once a virtual camera is changed in this way, change of a virtual camera will become disapproval until given period TC passes. For example, even if lock on newly arises like F2, F3, and F4, change processing of a virtual camera is not performed. And if lock on arises after given period TC's passing as shown in F5, a virtual camera will be changed as shown in F6.

[0085]That is, when the technique of drawing 8 was not adopted and the lock on to an enemy object arises repeatedly for a short time, a virtual camera will change frequently (the picture of drawing 4 (A) and (B) changes frequently), and the replay picture generated will become very unsightly.

[0086]On the other hand, if the technique of drawing 8 is adopted, change of a virtual camera will become disapproval until given period TC passes. Therefore, also when the lock on to an enemy object arises repeatedly for a short time, it is natural and the replay picture which a virtual camera will not change frequently and is generated can be made into that comfortable.

[0087]3. Explain the detailed detailed example of processing of this embodiment, next this embodiment using the flow chart of drawing 9, drawing 10, and drawing 11.

[0088]First, based on the position data of a player object, and the position data of an enemy object, lock on (prehension) decision processing is performed and an enemy object judges whether only the given frame number entered in lock on area (Step S1, S2). And when it enters, a lock on flag is set to 1 (Step S3).

[0089]That is, as shown in drawing 12, in this embodiment, the lock on area 40 is set up based on position PM, direction DMs (the direction of shooting, etc.), given distance DL, and the given angle (solid angle) alpha of the player object 10. And based on position PE of the enemy object 16, the enemy object 16 judges whether only the given frame number entered in the lock on area 40. And when it enters, a lock on flag is set to 1.

[0090]When it is judged that the enemy object is not contained in lock on area, the enemy object by which lock on had already been carried out judges whether it came out of lock on area (step S4). And when it comes outside, a lock on flag is reset to 0 (Step S5).

[0091]Next, it is judged whether the lock on flag changed from the last frame (Step S6). And when not changing, virtual camera alteration data is not remembered that drawing 7 explained by the replay data storage part.

[0092]On the other hand, when a lock on flag changes, it is judged how the lock on flag changed (Step S7). And when a lock on flag changes to 1 from 0 (when lock on newly begins). The virtual camera alteration data containing ID (identification data) of a player object and ID of an enemy object by which lock on is carried out is memorized to a replay data storage part by packet format (refer to drawing 5) (Step S8). On the other hand, when a lock on flag changes to 0 from 1, the virtual camera alteration data containing ID which shows ID and those without lock on of a player object is memorized to a replay data storage part by packet format (step S9). (when lock on is canceled)

[0093]Drawing 11 is a flow chart at the time of replay processing.

[0094]First, replay data is read from a replay data storage part (Step T1). And it is judged whether the virtual camera alteration data contained in the read replay data contains ID which shows those without lock on (Step T2). And when contained, ID which shows ID and those without lock on of a player object is passed to a virtual camera treating part (virtual camera manipulation routine) (step T3). Then, a virtual camera treating part performs processing which changes the usual virtual camera at random, as shown in E1 of drawing 3 (Step T4). On the other hand, when ID which shows those without lock on is not included, ID of a player object and ID of an enemy object are passed to a virtual camera treating part (Step T5). Then, a virtual camera treating part performs processing which changes the virtual camera for lock on at random, as shown in E2 of drawing 3.

[0095]By making it above, when the lock on of the enemy object is carried out in a game, the virtual camera used for generation of a replay picture comes to be changed into the virtual camera for lock on.

[0096]4. An example of hardware constitutions, next the composition of the hardware which can realize this embodiment is explained using drawing 13. In the system shown in the figure, CPU1000, ROM1002, RAM1004, information-storage-medium 1006, and sound generation IC1008, image generation IC1010, and I/O Ports 1012 and 1014 are mutually connected by the system bath 1016 so that data transmission and reception is possible. And the display 1018 is connected to said image generation IC1010, the loudspeaker 1020 is connected to sound generation IC1008, the control apparatus 1022 is connected to I/O Port 1012, and the communication apparatus 1024 is connected to I/O Port 1014.

[0097]Image data for the information storage medium 1006 to express a program and a display thing, sound data, etc. are mainly stored. For example, in a home game system, DVD, a game cassette, CDROM, etc. are used as an information storage medium which stores a game program etc. In a business-use game system, memories, such as ROM, are used and the information storage medium 1006 is set to ROM1002 in this case.

[0098]The control apparatus 1022 is a device for inputting into the main part of a system the result of the judgment which is equivalent to a game controller, a navigational panel, etc., and a player performs according to game progress.

[0099]According to the program stored in the information storage medium 1006, the system programs (initialization information of the main part of a system, etc.) stored in ROM1002, the signal inputted by the control apparatus 1022, etc., CPU1000 performs control of the whole system, and various data processing. RAM1004 is a memory measure used as workspace of this CPU1000, etc., and the information storage medium 1006, the given contents of ROM1002, or the result of an operation of CPU1000 is stored. The data structure with the logical composition for realizing this embodiment will be built on this RAM or an information storage medium.

[0100]Sound generation IC1008 and image generation IC1010 are provided in this kind of system, and the suitable output of a game sound or a game image can be performed now in it. Sound generation IC1008 is an integrated circuit which generates game sounds, such as a sound effect and background music, based on the information memorized by information-storage-medium 1006 and ROM1002, and the generated game sound is outputted by the loudspeaker 1020. Image generation IC1010 is an integrated circuit which generates the pixel information for outputting to the display 1018 based on the picture information sent from RAM1004, ROM1002, and information-storage-medium 1006 grade. As the display 1018, what is called what is called a head mount display (HMD) can also be used.

[0101]It is used for exchanging with the exterior various kinds of information used inside a game system, being connected with other game systems, and the communication apparatus 1024 sending and receiving the given information according to a game program, or sending and receiving information, including a game program etc., via a communication line etc.

[0102]And various processings in which it explained by drawing 1 - drawing 12 are realized by CPU1000, image generation IC1010, or the sound generation IC1008 grade which operates based on the information storage medium 1006 which stored the information on a program, data, etc., the information from this information storage medium 1006, etc. CPU1000 or general-purpose DSP may perform by software processing performed in image generation IC1010 and sound generation IC1008 grade.

[0103]The example at the time of applying this embodiment to a business-use game system is shown in drawing 14 (A). Looking at the game image projected on the display 1100, a player operates the lever 1102 and button 1104 grade, and enjoys a game. CPU, image generation IC, sound generation IC, etc. are mounted in the system board (circuit board) 1106 built in. And processing of this embodiment

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[Translation done.]

* NOTICES *

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1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]It is an example of the block diagram of the game system of this embodiment.
[Drawing 2]It is a figure for explaining the lock on (prehension) of an enemy object.
[Drawing 3]When the lock on of the enemy object is carried out, it is a figure for explaining the technique of changing the virtual camera at the time of replay.
[Drawing 4]Drawing 4 (A) and (B) is a figure showing the example of the replay picture projected with the changed virtual camera.
[Drawing 5]Only a packet required for replay processing of the frame concerned is memorized as replay data, and it is a figure for explaining the technique of memorizing virtual camera alteration data as one of such the packets.
[Drawing 6]It is a figure for explaining the classification data added to the header of a packet.
[Drawing 7]It is a figure for explaining the technique of memorizing virtual camera alteration data as replay data, on condition that it changed from the last frame.
[Drawing 8]It is a figure for explaining the technique of making a change of a virtual camera disapproval until a given period passes, once a virtual camera is changed.
[Drawing 9]It is a flow chart which shows the detailed example of processing of this embodiment.

[Drawing 10]It is a flow chart which shows the detailed example of processing of this embodiment.
[Drawing 11]It is a flow chart which shows the detailed example of processing of this embodiment.
[Drawing 12]It is a figure for explaining lock on area.
[Drawing 13]It is a figure showing an example of the composition of the hardware which can realize this embodiment.
[Drawing 14]Drawing 14 (A), (B), and (C) is a figure showing the example of the system of various gestalten by which this embodiment is applied.
[Drawing 15]Drawing 15 (A) and (B) is a figure for explaining the example of application to a fishing game and a baseball game.
[Drawing 16]It is a figure for explaining the example of application to a soccer game.
[Description of Notations]
10 Player object
12, 14, 16 enemy objects
40 Lock on area
50 Fish
52 Lure
60 Outfielder
62 Ball
70 and 71 Player
72 Ball
100 Treating part
110 Game operation part

112 Replay data generating part
113 Lock on judgment part
114 Packet treating part
116 Judgment part
117 Compression zone
118 Assembly part
119 Writing part
120 Replay treating part
122 Read section
123 Treating part
124 Virtual camera treating part
126 Virtual camera changing part
130 Final controlling element
140 Storage parts store
150 Information storage medium
160 Image generation part
162 Indicator
170 Sound generation part
172 Sound output part
174 Communications department
176 I/F part
180 Memory card

[Translation done.]

* NOTICES *

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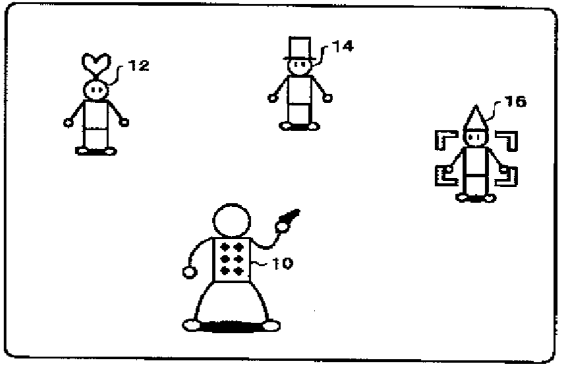
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

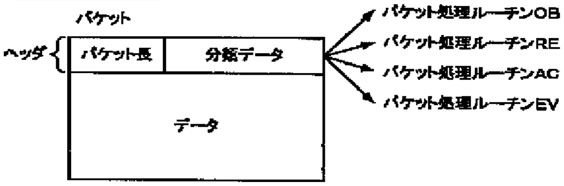
DRAWINGS

[Drawing 2]

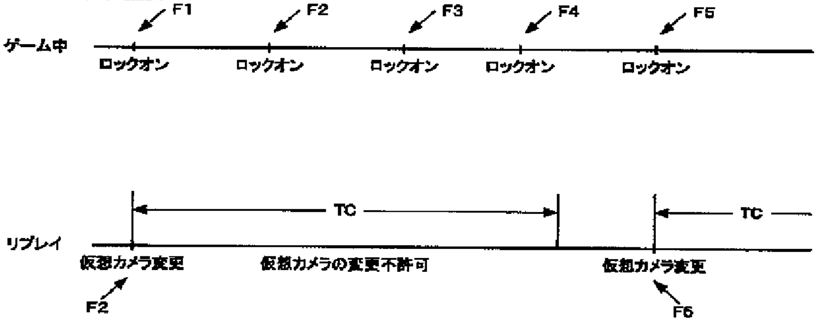


ロックオン ⇒ 仮想カメラ変更データを記憶

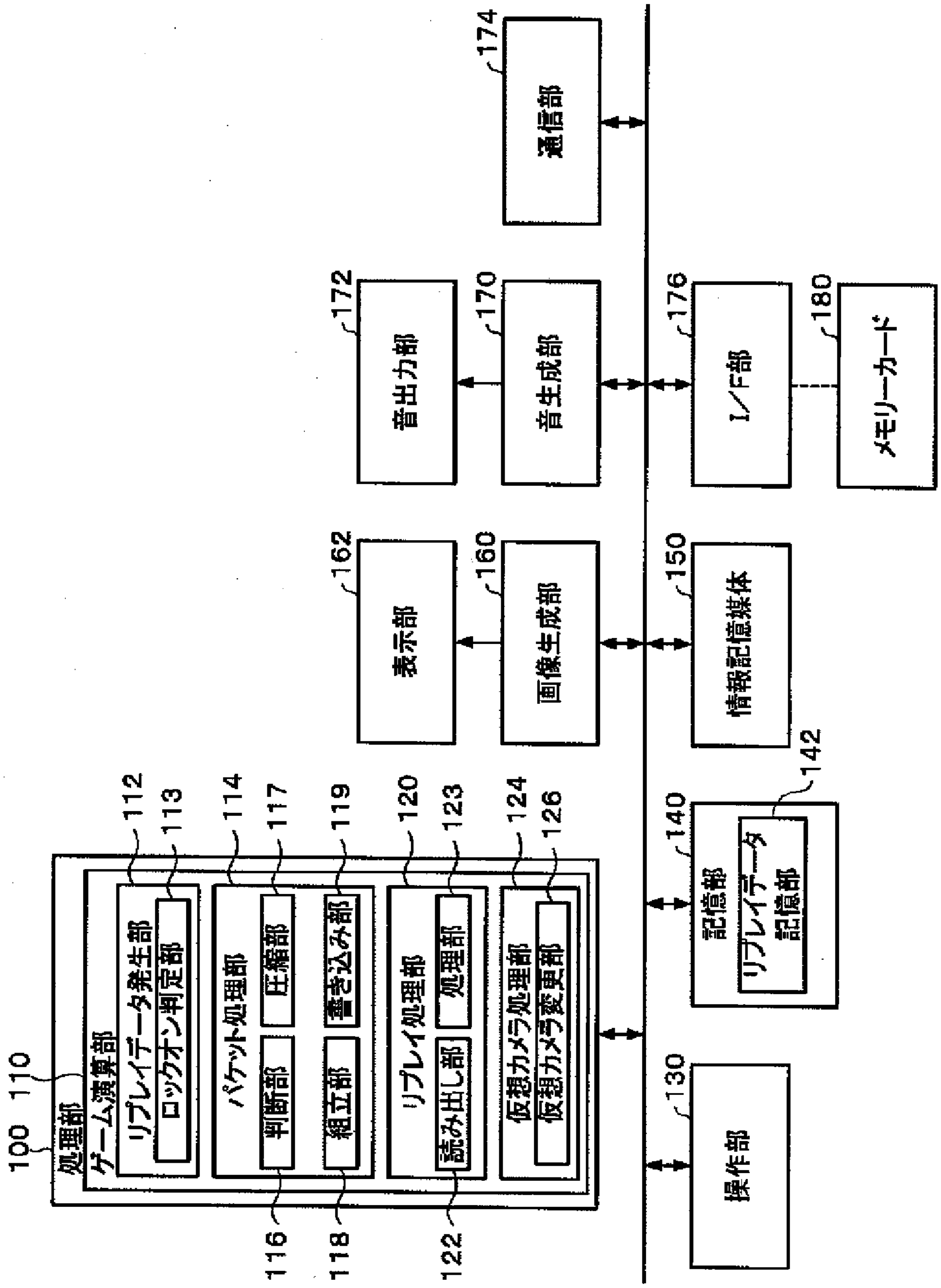
[Drawing 6]



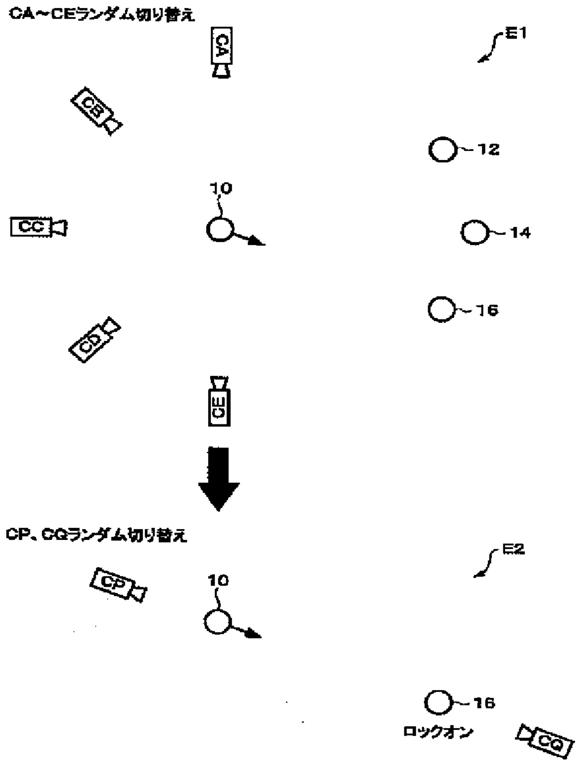
[Drawing 8]



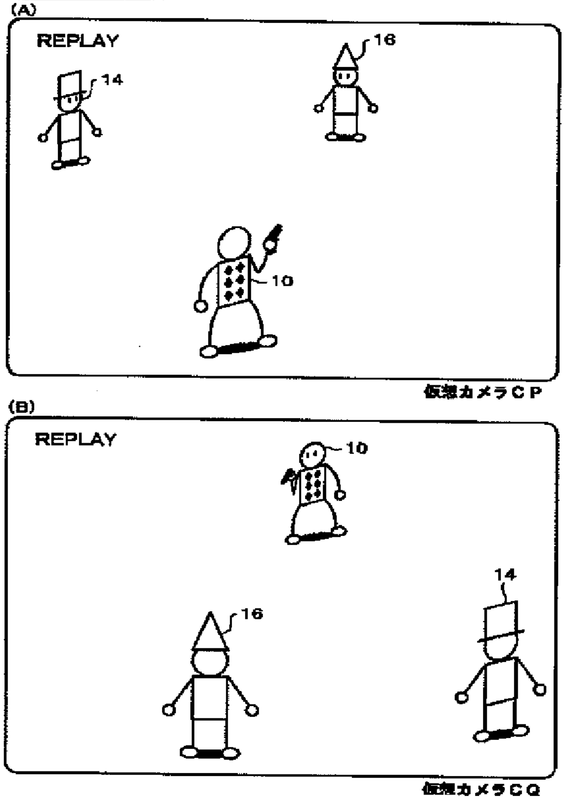
[Drawing 1]


100
110
処理部
ゲーム演算部
112
113
リプレイデータ発生部
ロックオン判定部
114
117
119
116
118
パケット処理部
判断部
圧縮部
組立部
書き込み部
120
123
122
リプレイ処理部
読み出し部
処理部
124
126
仮想カメラ処理部
仮想カメラ変更部
130
操作部
140
142
記憶部
リプレイデータ記憶部
150
情報記憶媒体
160
画像生成部
162
表示部
170
音生成部
172
音出力部
176
I/F部
180
メモリーカード
174
通信部

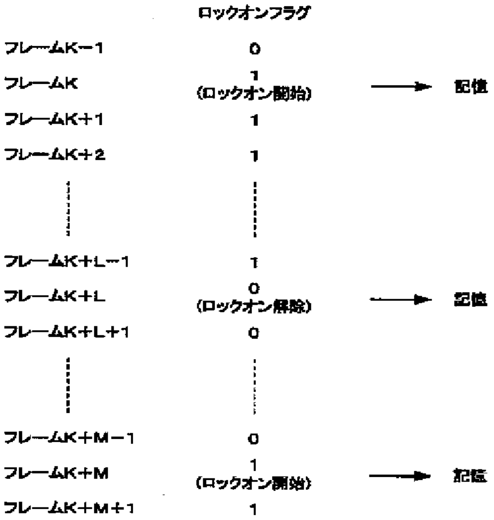
[Drawing 3]



[Drawing 4]

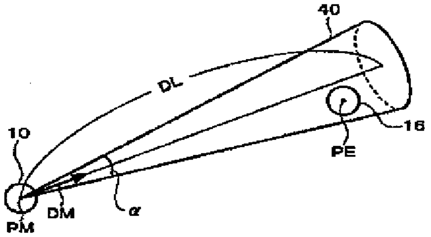


[Drawing 7]

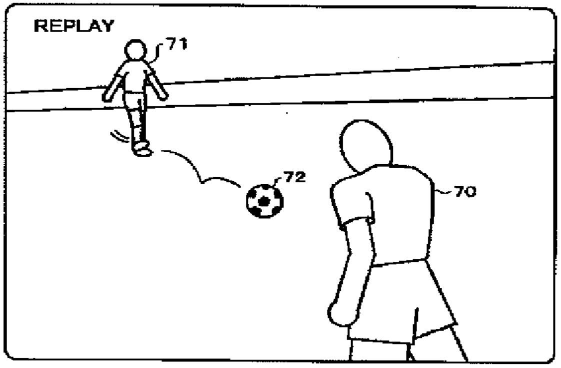


	ロックオンフラグ		
フレームK−1	0		
フレームK	1 (ロックオン開始)	──►	記憶
フレームK+1	1		
フレームK+2	1		
⋮	⋮		
フレームK+L−1	1		
フレームK+L	0 (ロックオン解除)	──►	記憶
フレームK+L+1	0		
⋮	⋮		
フレームK+M−1	0		
フレームK+M	1 (ロックオン開始)	──►	記憶
フレームK+M+1	1		

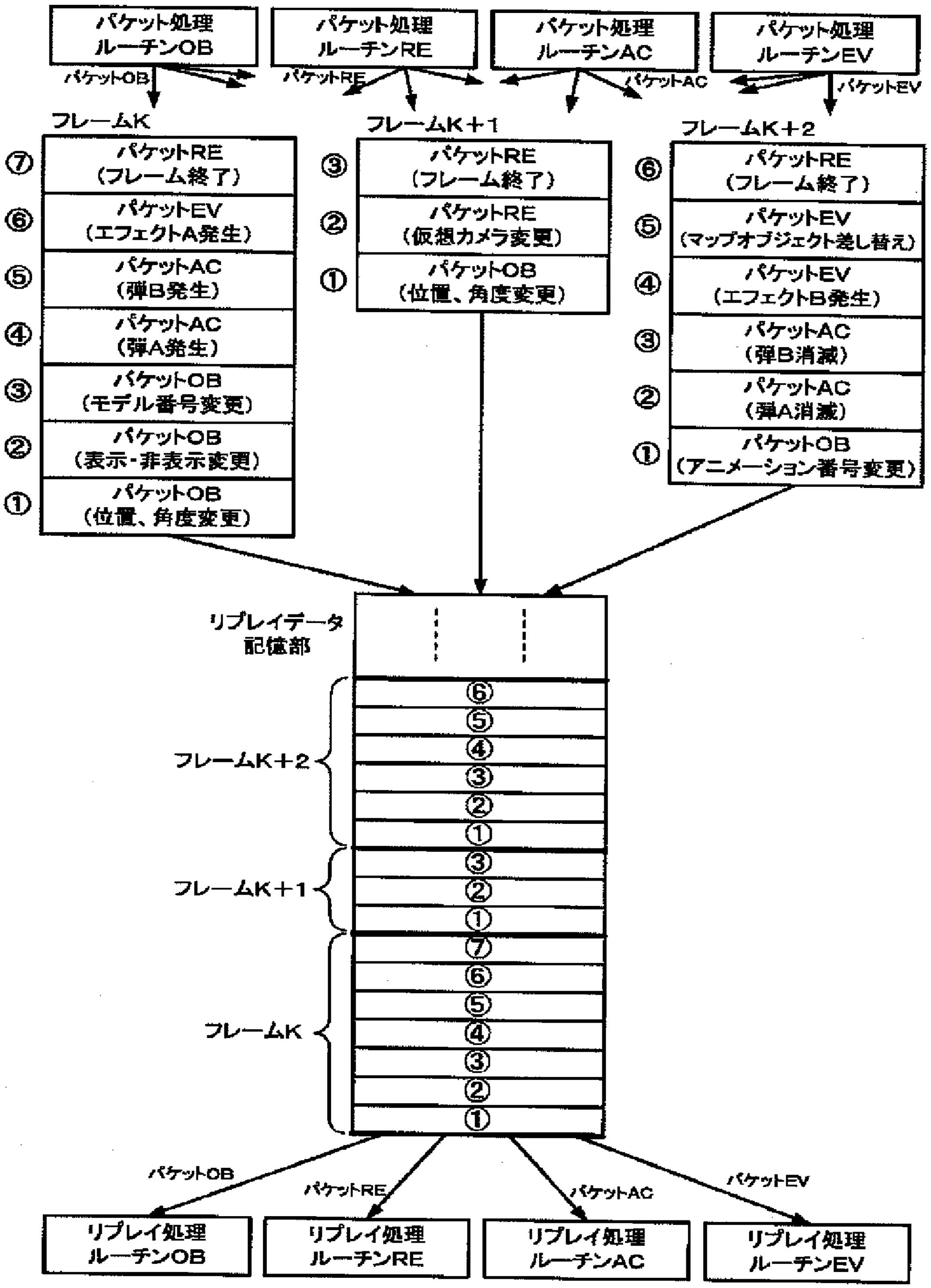
[Drawing 12]



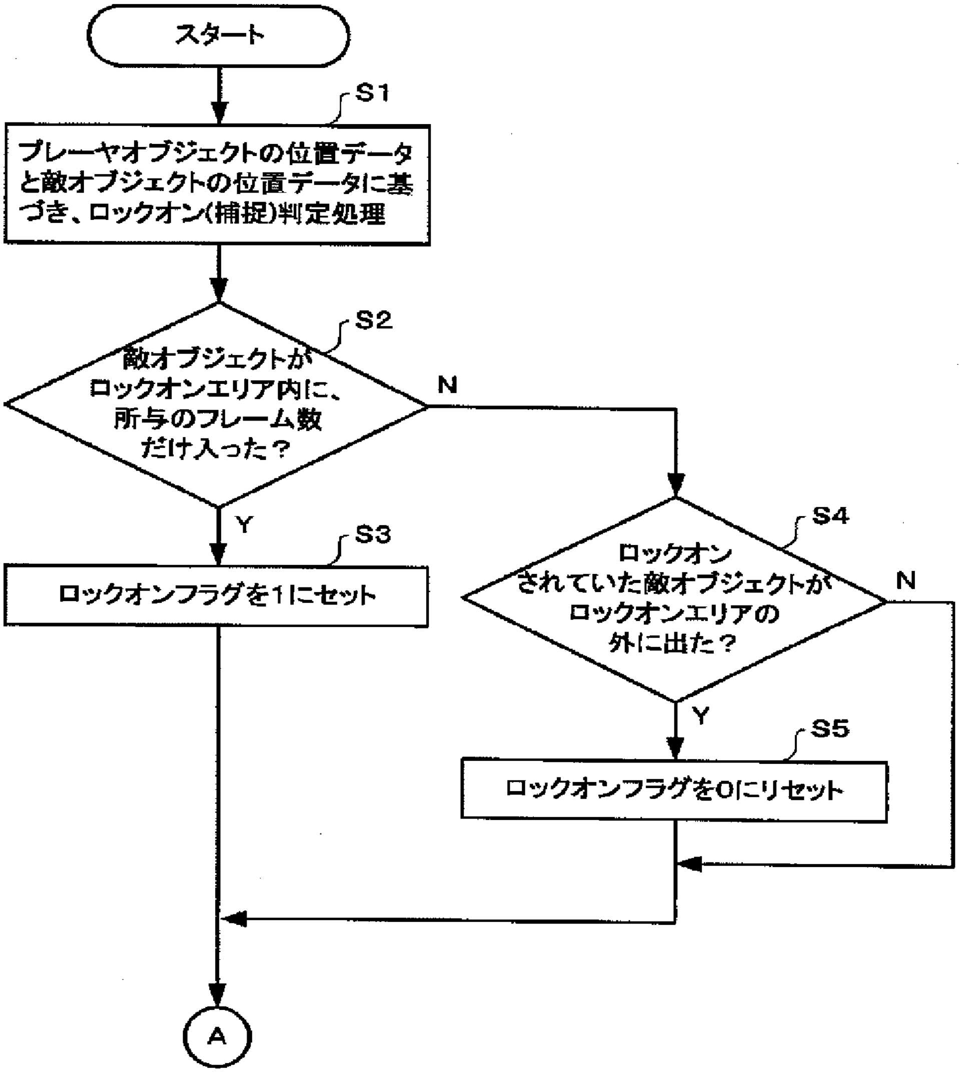
[Drawing 16]



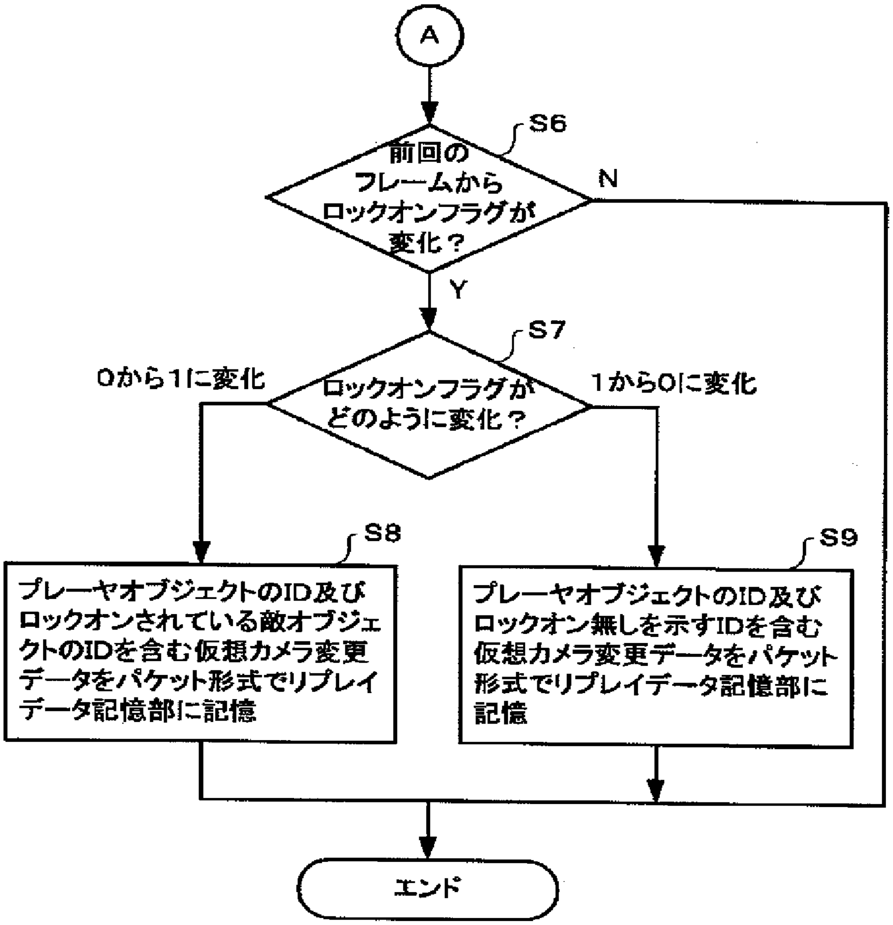
[Drawing 5]


パケット処理 ルーチンOB
パケット処理 ルーチンRE
パケット処理 ルーチンAC
パケット処理 ルーチンEV
パケットOB
パケットRE
パケットAC
パケットEV
フレームK
⑦ パケットRE（フレーム終了）
⑥ パケットEV（エフェクトA発生）
⑤ パケットAC（弾B発生）
④ パケットAC（弾A発生）
③ パケットOB（モデル番号変更）
② パケットOB（表示・非表示変更）
① パケットOB（位置、角度変更）
フレームK＋1
③ パケットRE（フレーム終了）
② パケットRE（仮想カメラ変更）
① パケットOB（位置、角度変更）
フレームK＋2
⑥ パケットRE（フレーム終了）
⑤ パケットEV（マップオブジェクト差し替え）
④ パケットEV（エフェクトB発生）
③ パケットAC（弾B消滅）
② パケットAC（弾A消滅）
① パケットOB（アニメーション番号変更）
リプレイデータ記憶部
フレームK＋2
⑥
⑤
④
③
②
①
フレームK＋1
③
②
①
フレームK
⑦
⑥
⑤
④
③
②
①
パケットOB
パケットRE
パケットAC
パケットEV
リプレイ処理 ルーチンOB
リプレイ処理 ルーチンRE
リプレイ処理 ルーチンAC
リプレイ処理 ルーチンEV

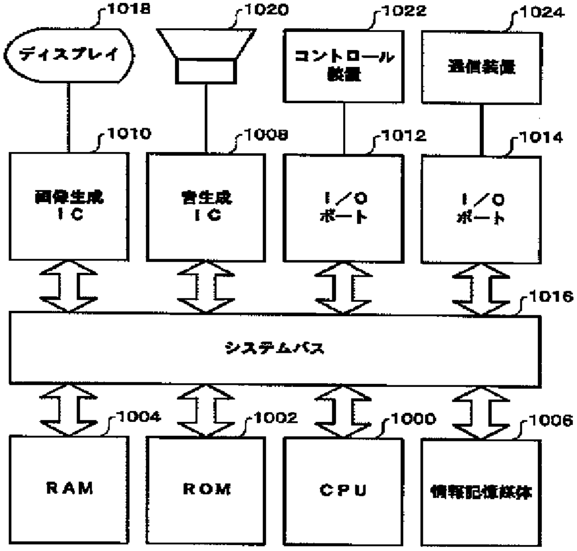
[Drawing 9]


スタート
S1
プレーヤオブジェクトの位置データと敵オブジェクトの位置データに基づき、ロックオン(捕捉)判定処理
S2
敵オブジェクトがロックオンエリア内に、所与のフレーム数だけ入った？
N
Y
S3
ロックオンフラグを1にセット
S4
ロックオンされていた敵オブジェクトがロックオンエリアの外に出た？
N
Y
S5
ロックオンフラグを0にリセット
A

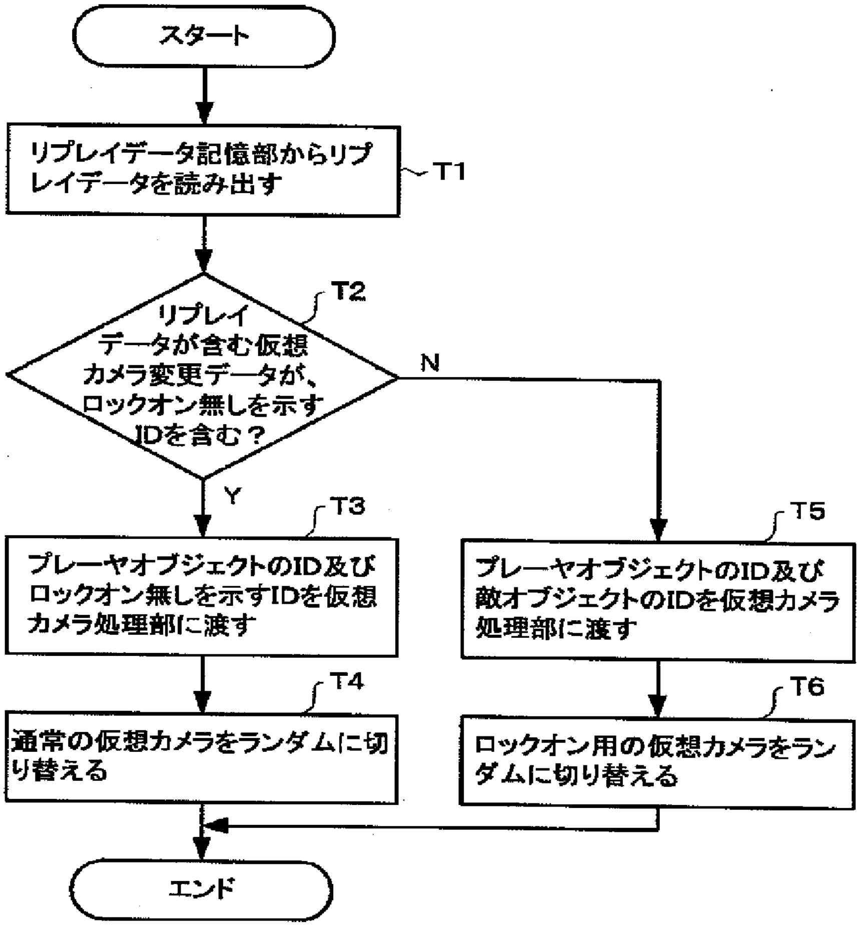
[Drawing 10]


A
S6
前回の
フレームから
ロックオンフラグが
変化？
N
Y
S7
0から1に変化
ロックオンフラグが
どのように変化？
1から0に変化
S8
プレーヤオブジェクトのID及び
ロックオンされている敵オブジェ
クトのIDを含む仮想カメラ変更
データをパケット形式でリプレイ
データ記憶部に記憶
S9
プレーヤオブジェクトのID及び
ロックオン無しを示すIDを含む
仮想カメラ変更データをパケット
形式でリプレイデータ記憶部に
記憶
エンド

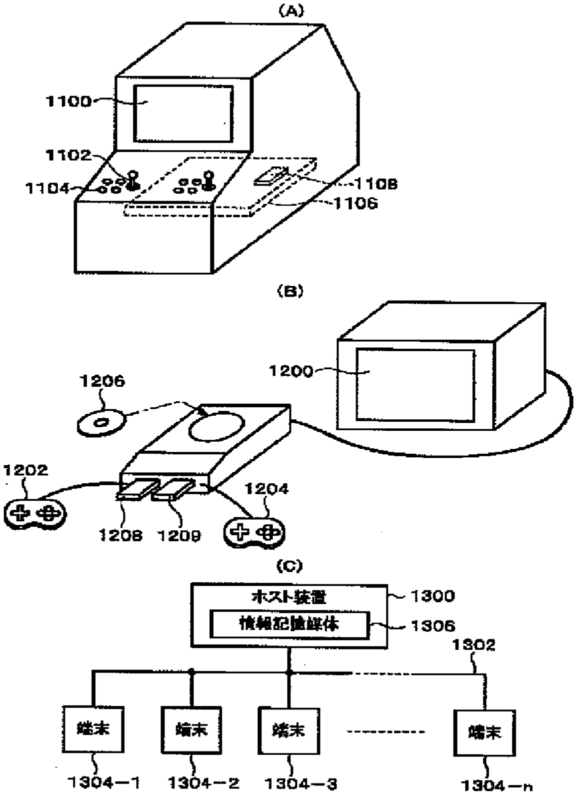
[Drawing 13]



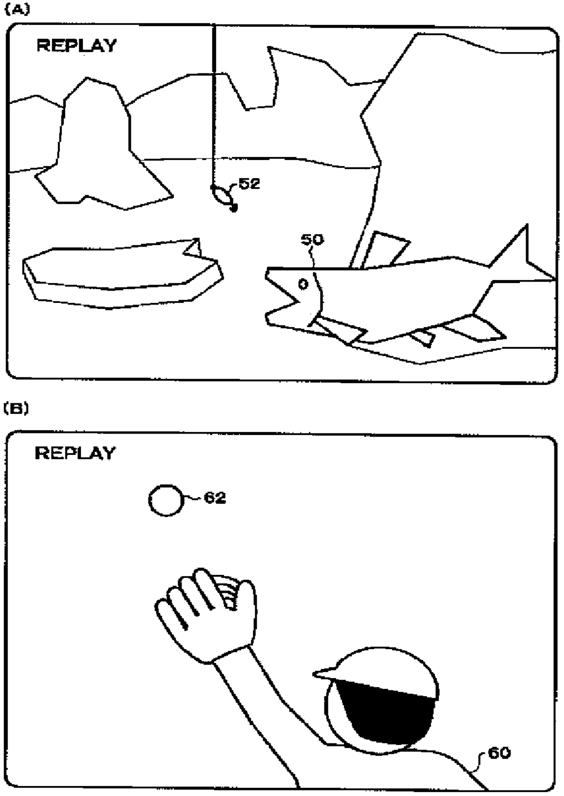
[Drawing 11]


スタート
リプレイデータ記憶部からリプレイデータを読み出す
T1
リプレイデータが含む仮想カメラ変更データが、ロックオン無しを示すIDを含む？
T2
N
Y
プレーヤオブジェクトのID及びロックオン無しを示すIDを仮想カメラ処理部に渡す
T3
プレーヤオブジェクトのID及び敵オブジェクトのIDを仮想カメラ処理部に渡す
T5
通常の仮想カメラをランダムに切り替える
T4
ロックオン用の仮想カメラをランダムに切り替える
T6
エンド

[Drawing 14]


(A)
1100
1102
1104
1108
1106
(B)
1206
1200
1202
1204
1208
1209
(C)
ホスト装置
1300
情報記憶媒体
1306
1302
端末
端末
端末
端末
1304−1
1304−2
1304−3
1304−n

[Drawing 15]



[Translation done.]

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CORRECTION OR AMENDMENT

[Kind of official gazette]Printing of amendment by regulation of 2 of Article 17 of Patent Law
[Section classification] The 2nd classification of the part I gate
[Publication date]March 11 (2003.3.11), Heisei 15

[Publication No.]JP,2000-334168,A (P2000-334168A)
[Date of Publication]December 5, Heisei 12 (2000.12.5)
[Annual volume number] Publication of patent applications 12-3342
[Application number]Japanese Patent Application No. 11-146584
[The 7th edition of International Patent Classification]

A63F 13/00

G06T 15/70
[FI]

A63F 9/22 C

H

G06F 15/62 340 K

[A written amendment]
[Filing date]December 4 (2002.12.4), Heisei 14
[The amendment 1]
[Document to be Amended]Specification
[Item(s) to be Amended]Claim
[Method of Amendment]Change
[Proposed Amendment]
[Claim(s)]
[Claim 1]It is a game system for generating a game image,
A means which is written in a replay data storage means by using virtual camera alteration data as replay data, and is made to memorize when the 2nd object in two or more objects is in a seized condition into a game,
A means to change a virtual camera used for generation of a replay picture based on said virtual camera alteration data contained in memorized replay data,
****** -- a game system characterized by things.
[Claim 2]In claim 1,
A game system, wherein said seized condition is in a lock on state in a shooting game.
[Claim 3]It is a game system for generating a game image,
A means which is written in a replay data storage means by using virtual camera alteration data as replay data, and is made to memorize when action arises between the 1st and 2nd object, or

when this action becomes possible,
A means to change a virtual camera used for generation of a replay picture based on said virtual camera alteration data contained in memorized replay data,
****** -- a game system characterized by things.
[Claim 4]It is a game system for generating a game image,
A means which is written in a replay data storage means by using virtual camera alteration data as replay data, and is made to memorize when it is judged that given physical relationship is between the 1st and 2nd object based on position data of the 1st and 2nd object,
A means to change a virtual camera used for generation of a replay picture based on said virtual camera alteration data contained in memorized replay data,
****** -- a game system characterized by things.
[Claim 5]In either of claims 1 thru/or 4,
A game system, wherein a virtual camera used for generation of a replay picture is changed into a virtual camera which turns to a direction of the 2nd object from a viewpoint of the 1st object or a player based on said virtual camera alteration data.
[Claim 6]In either of claims 1 thru/or 5,
A game system, wherein a virtual camera used for generation of a replay picture is changed into a virtual camera arranged around the 2nd object based on said virtual camera alteration data.
[Claim 7]In either of claims 1 thru/or 6,
While a packet which a packet required for replay processing of the frame concerned was judged, and was judged to be required in a packet used for replay processing writes in a replay data storage means as replay data corresponding to the frame concerned and is memorized,
A game system, wherein said virtual camera alteration data writes in a replay data storage means as one of said the packets and is memorized.
[Claim 8]In either of claims 1 thru/or 7,
A game system characterized by virtual camera alteration data being memorized by replay data storage means as replay data on condition that it changed from the last frame.
[Claim 9]In either of claims 1 thru/or 8,
A game system, wherein change of a virtual camera becomes disapproval even if change of a virtual camera is directed until a given period passes, after a virtual camera is changed based on said virtual camera alteration data.
[Claim 10]A computer is an usable information storage medium,
A means which is written in a replay data storage means by using virtual camera alteration data as replay data, and is made to memorize when the 2nd object in two or more objects is in a seized condition into a game,
As a means to change a virtual camera used for generation of a replay picture based on said virtual camera alteration data contained in memorized replay data,
An information storage medium including a program as which a computer is operated.
[Claim 11]In claim 10,
An information storage medium, wherein said seized condition is in a lock on state in a shooting game.
[Claim 12]A computer is an usable information storage medium,
A means which is written in a replay data storage means by using virtual camera alteration data as replay data, and is made to memorize when action arises between the 1st and 2nd object, or when this action becomes possible,
As a means to change a virtual camera used for generation of a replay picture based on said virtual camera alteration data contained in memorized replay data,
An information storage medium including a program as which a computer is operated.
[Claim 13]A computer is an usable information storage medium,
A means which is written in a replay data storage means by using virtual camera alteration data as replay data, and is made to memorize when it is judged that given physical relationship is between the 1st and 2nd object based on position data of the 1st and 2nd object,
As a means to change a virtual camera used for generation of a replay picture based on said virtual camera alteration data contained in memorized replay data,

An information storage medium including a program as which a computer is operated.
[Claim 14]In either of claims 10 thru/or 13,
An information storage medium, wherein a virtual camera used for generation of a replay picture is changed into a virtual camera which turns to a direction of the 2nd object from a viewpoint of the 1st object or a player based on said virtual camera alteration data.
[Claim 15]In either of claims 10 thru/or 14,
An information storage medium, wherein a virtual camera used for generation of a replay picture is changed into a virtual camera arranged around the 2nd object based on said virtual camera alteration data.
[Claim 16]In either of claims 10 thru/or 15,
While a packet which a packet required for replay processing of the frame concerned was judged, and was judged to be required in a packet used for replay processing writes in a replay data storage means as replay data corresponding to the frame concerned and is memorized,
An information storage medium, wherein said virtual camera alteration data writes in a replay data storage means as one of said the packets and is memorized.
[Claim 17]In either of claims 10 thru/or 16,
An information storage medium characterized by virtual camera alteration data being memorized by replay data storage means as replay data on condition that it changed from the last frame.
[Claim 18]In either of claims 10 thru/or 17,
An information storage medium, wherein change of a virtual camera becomes disapproval even if change of a virtual camera is directed until a given period passes, after a virtual camera is changed based on said virtual camera alteration data.

[Translation done.]